

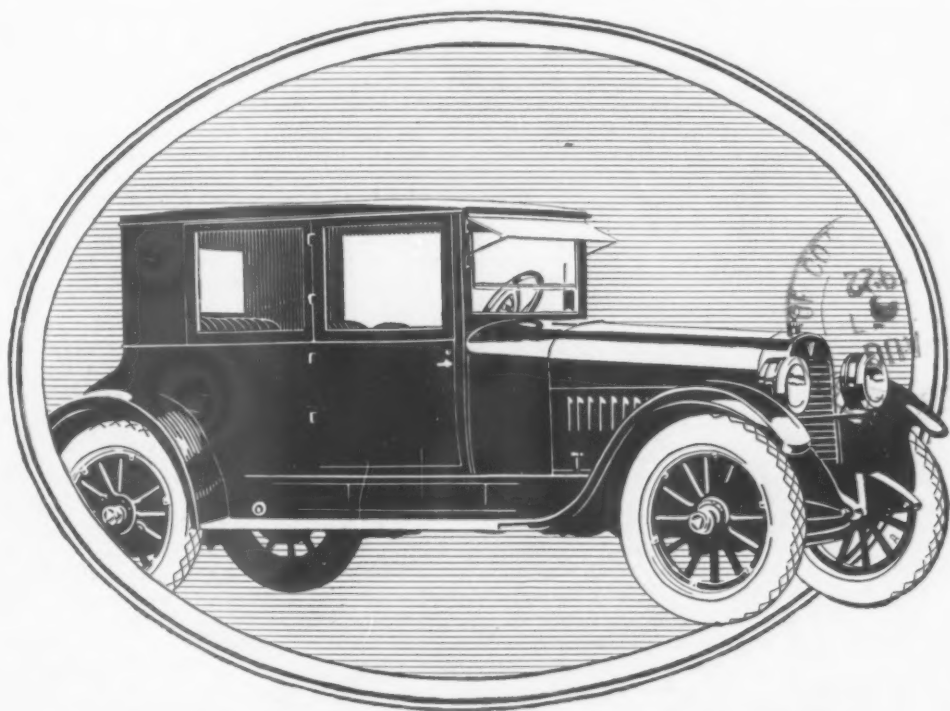
In This Issue—*What Is a Flat Rate? and Why?*

# MOTOR AGE

Vol. XLII  
Number 5

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, AUGUST 3, 1922

Thirty-five Cents a Copy  
Three Dollars a Year



## Hudson Policy Makes Prosperous Dealers

Hudson has meant prosperity to its dealers. Many have become wealthy. In every community they are leaders. Their salesrooms are the show places of the automobile industry.

The reason is the undisputed front position Hudson has always held as a value. For more than six years it has led fine car sales without interruption.

Hudson now make but four models—the Coach, Sedan, the Speedster and the 7 Passenger Touring Car. They

are the surpassing fine car values of all time.

The Coach, designed and developed by Hudson, is a beautiful closed car costing only 6% above open models. It is the largest-selling closed car among all the world's fine cars.

If you want some of the success Hudson dealers have won in such generous measure, with the security that is characteristic of Hudson, write today.



Speedster, \$1645; 7 Passenger Phaeton, \$1695; Coach, \$1745; Sedan, \$2295  
*Freight and Tax Extra*

**HUDSON MOTOR CAR COMPANY**  
DETROIT, MICHIGAN



# NO-LEAK-O Piston Rings



## Customers Knocking At Your Door

Dealers who are taking advantage of No-Leak-O National Advertising are adding to their satisfied customer list every day. Millions of motorists are being told month in and month out to "hook up" with a garage that shows the No-Leak-O sign. The result is bound to be *SATISFACTION*.

Motorists know that No-Leak-O Piston Rings 'Won't leak because they're sealed with oil.' The specially cut "oilSEALing" groove—found only in No-Leak-O prevents oil and gas leakage and gives *perfect oil control and compression in each individual ring*. "Unburnt" gas or kerosene can't leak down and injure lubrication if No-Leak-O rings are used.

No-Leak-O Piston Rings are made in one piece—easy to install—of finest material—most economical. Fully guaranteed. Over 200 reliable jobbers carry No-Leak-O Piston Rings in all sizes and over sizes. Prompt service *always*.

For replacement jobs you need a dependable ring designed and made especially to give satisfaction on replacement jobs. No-Leak-O started as a replacement ring; they are still the leading replacement ring; they make good on every job.

Write for free booklet, "Know the Facts About Grooved Piston Rings." Also let us tell you about our liberal dealer proposition and how our National Advertising can increase your profits. Quick action on your part will mean bigger profits.

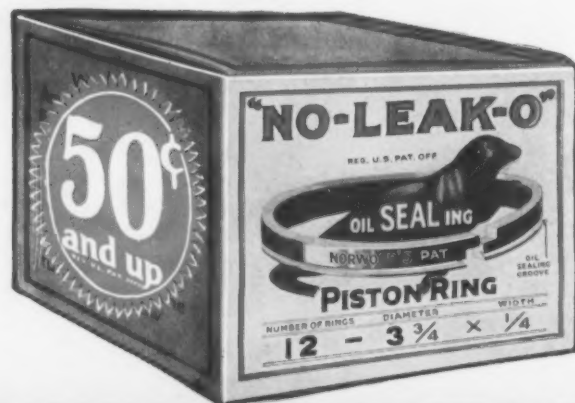
## NO-LEAK-O PISTON RING COMPANY

Dept. T-28  
BALTIMORE, MD.

One price during eight years of continued success

One design—for all cars—50c and up

*Important*—In buying piston rings insist on the genuine No-Leak-O with the original "oilSEALing" groove, packed in this standard package bearing the famous ring and seal, our registered trade mark. Beware of imitations.



# WON'T LEAK

because they're sealed with Oil



**Wherever a Ball Bearing Is Needed  
You Will Find a STROM BEARING to Fit That Need**

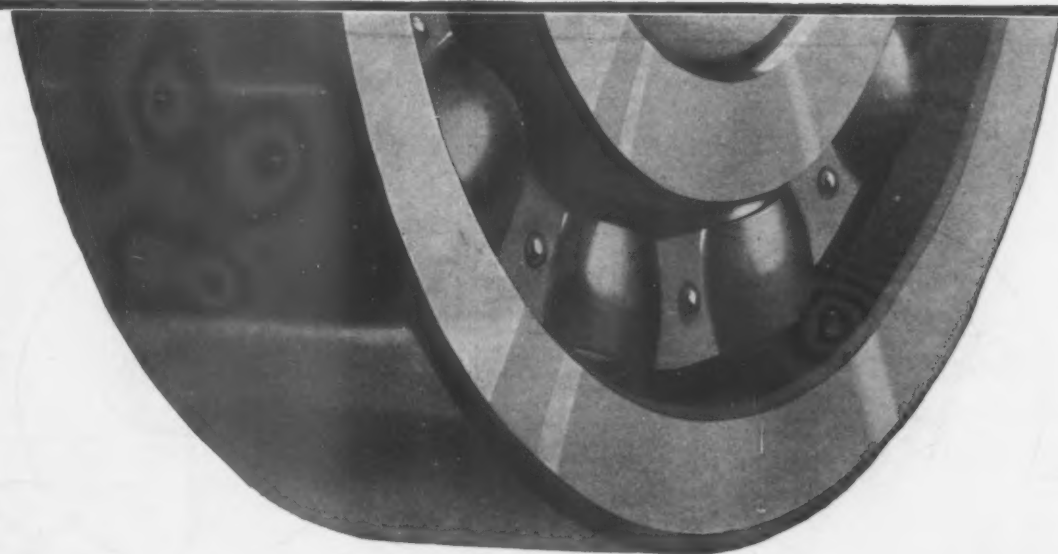
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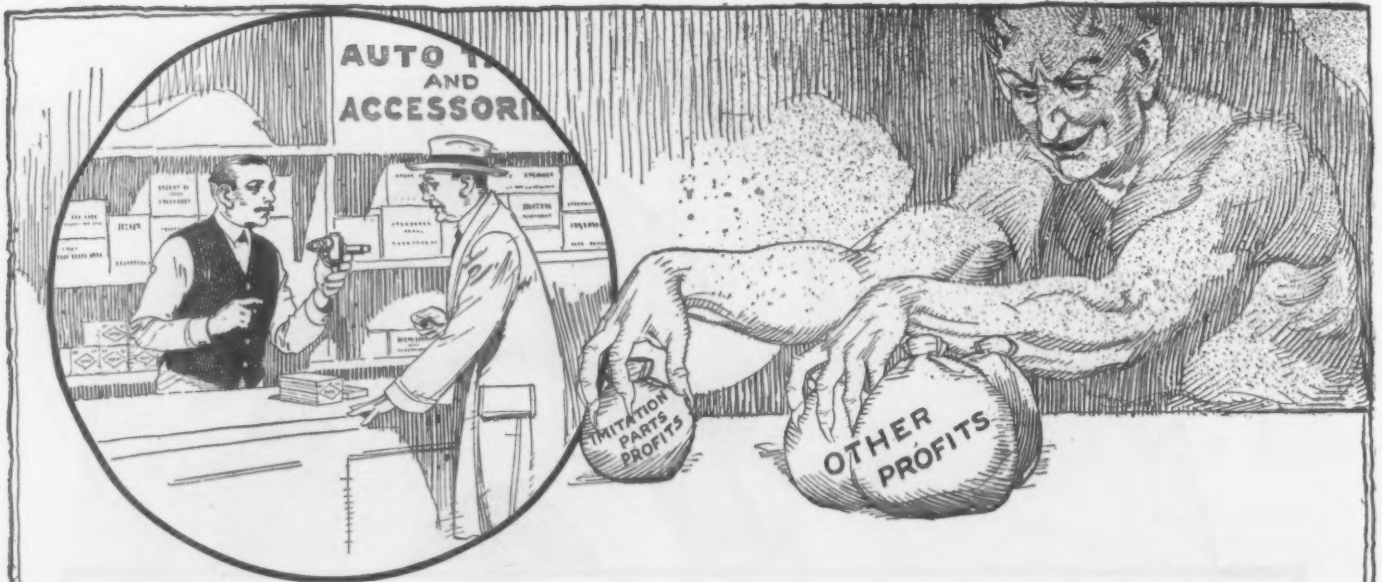


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**Strom**  
BEARINGS

*"Wherever a Shaft Turns"*





**P**ROFIT is the life blood of your business. When handled properly, it is that which makes your "game" practical and keeps the account books balancing on the right side. Goods that yield the bigger profit hold the greater attraction. There may be a few pennies more profit in non-genuine replacement parts but the dealer who handles them gambles with the "Imitation Parts Monster"—a two-faced demon—a wolf in sheep's clothing.

His attractive front—the few additional pennies made on each imitation part sold—crumbles under close inspection. To gamble with him means eventual financial loss and business failure. He plays two leading cards, "No, it isn't genuine, but it's just as good,"—"It looks the same as the genuine, and you can make a little more 'profit' on it."

An imitation part may have an appearance similar to the genuine, but in the acid test of Performance it fails to

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The Stewart-Warner Speedometer Corporation has followed for years the practice of marking their parts with a conspicuous Red Tag—no replacement part leaves our factory without one. We do it to protect the dealer, the customer and ourselves. The Tag—on Stewart parts identifies them—you know they are Genuine.

Through consistent advertising, the motoring public has been taught to "Look for the Red Tag!" They have learned—some through sad experience—that an intricate mechanism cannot give satisfactory service after a foreign part has been installed. That's why they demand the Genuine.

Handle only Genuine Stewart Replacement Parts.

You can't afford to do otherwise.

STEWART-WARNER SPEEDOMETER CORPORATION  
CHICAGO, U. S. A.




8847

**CAUTION**

This tag is attached to all genuine Stewart Repair Parts.

**LOOK FOR IT!**

If you don't find this tag, you are getting imitation substitute parts. Refuse to accept them.

The use of imitation parts on any Stewart Product, at our option, invalidates the Stewart guarantee.

For your own protection demand genuine Stewart Parts.

STEWART-WARNER SPEEDOMETER CORPORATION




# Stewart

**GENUINE PARTS**

## Look for the Red Tag



# MOTOR AGE

Published Every Thursday by  
THE CLASS JOURNAL COMPANY  
MALLERS BUILDING  
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Vol. XLII

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Entered as Second Class Matter Sept. 19, 1899, at the Post Office  
at Chicago, Ill., under Act of March 6, 1879.



## The Gasoline Hose without a Drawback

Here is where Goodrich's half century of rubber experience saves you money, time and trouble. Gasoline and rubber are natural enemies—it has taken Goodrich years to discover how to make them friends, and Goodrich has patented the secret.

### No more rubber in "gas" tanks

The devitalizing action of gasoline on the rubber tube is conquered by a special Goodrich compound. The tube is further protected by a fabric liner held firmly in place by an inner coil of flat wire. Tube cannot check, soften, crack, become porous or peel. Particles of rubber cannot find their way to the automobile gas tank—there are none.

### Weather-proof

Goodrich "HIGH DUTY" Gasoline Hose has an extra heavy woven cotton jacket—dampness, dust, sun, rain, and frost cannot rot or crack it.

Meets all requirements of underwriters.

Your Goodrich Branch has this perfect gasoline hose in stock—any length up to 50 feet; in  $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", and 1 $\frac{1}{2}$ " sizes

THE GOODRICH RUBBER COMPANY  
Akron, Ohio

# GOODRICH

## Gasoline Hose



BUILDING THE FRAME FOR

## ROLLS-ROYCE

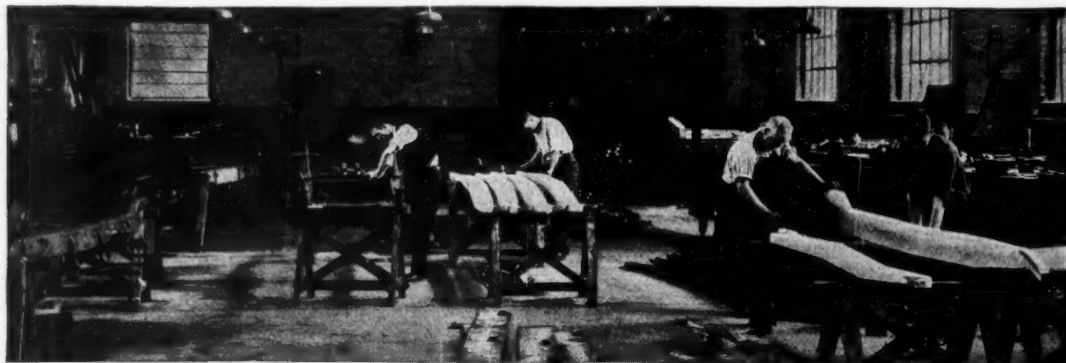
Each frame is built up, at the Rolls-Royce Works in Springfield, from the individual members of nickel-steel, and is proportioned as exactly as is humanly possible, to take care of all stresses without undue weight in any part. This frame is very stiff for the length of the car, with underbracing and tubular cross-members of weldless nickel-steel tube, with drop-forged ends, pegged and brazed in place, contributing to its strength.

No rivets are used, but instead tapered bolts are employed, fitting in taper-reamed holes in the frame. Thus, all slacks are eliminated and the frame remains rigid after years of usage. Because of its design and careful building, the Rolls-Royce car in campaigns in France, Messopotamia and the Soudan, during the Great War, proved immune from loosening-up of frames.

Write for "The Story of Rolls-Royce—  
Its Design, Workmanship and Materials"

**ROLLS-ROYCE**  
of America, Inc.  
SPRINGFIELD, MASS.

Visitors are Always  
Welcome at the Works



# MOTOR AGE



## Backing Up the Selling Campaign With Inside Management

*Fundamental Methods in the Shop and Office  
Stay Leaks and Prove Profits*

By CLYDE JENNINGS

**W**HEN you put on this selling campaign to overcome the slump in the buying campaign, according to the suggestions passed on in a recent issue of *MOTOR AGE*, you will need to do a few things to back up this campaign and so that you may know that it is profitable to you.

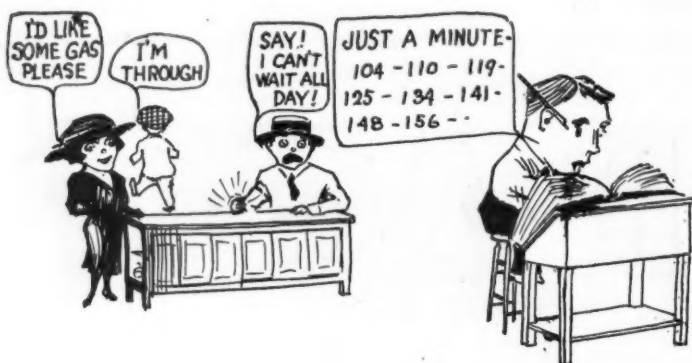
Merchandising records, like merchandising itself, are simple, but once a man starts to put his business transactions on record so that he can tell exactly how much money he is making, he never stops. The only danger

is that he is likely to become a record crank and finally get to the belief that all he has to do is to keep a lot of records of things that have been and things that are to be and that the business will go on forever.

That is not in any measure true, although some men are such good organizers that this appears to be true with them.

The fact is that all business is human and it is the spark of humanity and fairness that makes for the difference between good and bad business in most





cases. Some men are able to implant this spark into their employees in such a way that they make these workers or associates in business a component part of the concern. Some do this by a bonus share of the earnings, others do it merely by fair treatment and getting these workers to see that they can succeed and advance, only as the employer succeeds and advances. But this is rather getting off of the subject.

We started to outline some of the helps that you will need for the backing up of the sales campaign. We might mention only a few:

*Take an inventory and clean house.*

*Definite assignment of territory to sales people.*

*Prospect cards to be filled out by salesman who puts in claim for future.*

*Shop records which route and record costs of every maintenance job.*

*Shop stock records that will explain use of material.*

Most small merchants shy at the talk of records and book-keeping because they believe that it is going to cost them a lot of money and they are quite sure that they cannot afford it.

There is a great deal of misunderstanding about bookkeeping. The keeping of records or books is not at all a matter of mystery. It should be, and is, the most simple detail in the world once the merchant has decided that he will undertake it and gets started. True, intricate bookkeeping for a large firm is a very intricate craft and requires a craftsman to work out the system. But no such system is required for the ordinary retail establishment. And in the shop, forms are on the market that simplify what might become an intricate task there.

The hero of the "Shop Profits" film, which we hope you will all be able to see in the near future, got himself into a muddle by not keeping books. He hired a regular bookkeeper to come over to his shop and draw up a statement for him. This the man did in short order. It did not look much like the statement you see in annual statements of great concerns or bank statements.

It was a plain statement of the losses of this shop owner because of the lax conduct of his business. After this bookkeeper was through with his job of straightening out the muddle, he told the shop owner how to keep a perfectly satisfactory set of books and as the business went on, the shop owner kept the books in order without effort. But to take up the points outlined:

*Take an inventory and clean house.*

A lot of men in the merchandising business do not know how well off they are. The reason is that they have not listed their stock of goods on hand. They have not brushed out the corners, under the counters and looked in the out of the way places to find what they have for sale.

Everything in the store should be listed as of some value or thrown away. Often it is cheaper to throw away old merchandise than to try to sell it. But, the fact is, there is mighty little automotive merchandise that has not some value. It probably is not older than the oldest car in your neighborhood. If you can't sell it, give it to some one. Perhaps it will make a friend.

If the hidden merchandise is all right, but was bought at

too high a price, bring it out, polish it up and put it on sale at a price that will bring a buyer. If it is strictly summer goods, sell it by all means before frost comes. Never carry a purely seasonable article through the off season if you can get anything at all for it.

List all of the merchandise you have, and as summer is nearly over now, make up a bargain table of the articles that you want to move. Look up all of the odd sized tires and find if there are any old cars in your neighborhood that can use them. If there are not, offer them for sale to some dealer who is looking for such tires. A good many of the older sized tires are out of production and the owners of the old cars that need them will buy such a tire on sight. So will tire dealers who have such cars in their neighborhood. MOTOR AGE can help you find such dealers.

Perhaps you have some other merchandise that is made for a special car and you have been waiting for some one to come and buy it. Look up the owners of that special car in and near your home and go to them and "Ask 'em to Buy" these articles. Make them a price if necessary.

The big object is to learn what you have in stock, what it is worth and what you can do with it. What it cost you is not of special interest. That is of the past and should not be allowed to interfere with the future. After you have made this inventory, resolve that you will take an inventory at the beginning of each season so that you will know just where you stand.

Don't be afraid to put up a sign or an advertisement in the paper that you are running a bargain sale. Make a big noise about it. It is the money you want. Bigger merchants than you have such sales and are quite frank about over purchases and the need of money.

Once there was a druggist in a small town who had been conducting business in a regular conservative way for 20 years. In the meantime he had gathered a lot of odds and ends that he did not know what to do with. His son came home one holiday and amused himself by gathering up a great lot of this unsalable merchandise and preparing for a special sale. He had some striking dodgers printed. The druggist was afraid of the idea of such a sale but finally let the dodgers go out and the result surprised him. People congratulated him on getting "big town" ideas. He had the biggest week that his store had ever experienced and the best of it was that it was practically all profit. Some of the merchandise that he sold was more than 10 years old and some people bought things because they were old.

The automotive business is not an old one yet, but merchandise in this line can get old quickly because of the advance of the business itself. We laugh at a car of seven years ago and speak of it as we would speak of a book that was printed before the Civil war. Age is only relative and perhaps you can turn a lot of "old stuff" into money.

*Definite assignment of territory to sales people.*

We advised in a recent MOTOR AGE article to get some young men posted about your car or your merchandise and to start them out asking everybody if they knew that you had the Runwell car on sale. If you only send out one such missionary, you will not have much trouble about the territory lines, but if you send out more than one, it is best to have some idea as to where they will work. Duplication of effort is confusing and expensive. Class their territory by districts



or classes of people, but let each understand where he is to have full sway.

Then there must be a system of reports and claims for the future. You have told these young men that each customer they bring in will mean so much money to them. You want to be fair about this, but unless there is a record there will be disputes.

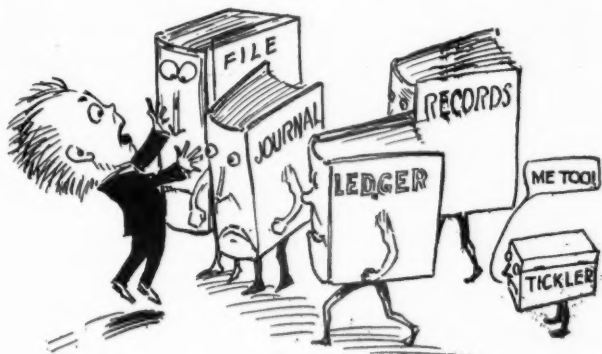
It is a very good plan to let the young man fill in a card for each visit he makes and then go over these cards yourself. If you think the person talked to is a prospect, file that card in a live prospect file. If you think he is not, file it in the dead file and forget it for the time being. If the prospect is a live one, it will pay you to speak to him yourself the next time you meet him at lodge, a picnic or on the street.

Of course you do not want to pay this young man commissions on sales to persons that he did not even speak to. If you are not keeping any record, the young man will be aware of that fact and he is very likely to think it easy to collect an extra commission or so by telling you after the sale is made that he had talked to this particular man.

This is one of the frequent sources of trouble in a sales department. The alibi to such trouble is so easy and so cheap that it is not worth while to get into trouble at all. Then, too, this prospect list is a mighty fine thing. It will, in time, tell you the attitude of nearly every person of importance in your community toward your products.

Last, but not least, it will give you a check on the activities of the young man.

Along about next March, you can take all of the cards filed this summer, look them over for the people who said they



might buy next year. You should start a new file with these cards.

It is a mighty hard thing to sit down in an office and canvass all of the people of your community mentally, even in a small town. One man who prided himself in a knowledge of his community that made prospect cards useless, overlooked his wife's brother!

These cards also make an excellent basis of a mailing list.

#### *Shop records which route and record costs of every maintenance job.*

A man learns only as he has a basis of fact for his knowledge. Many maintenance shops fail because the owner does not know whether or not he is making money and when he realizes that he is not, because he has less money than he formerly had, he cannot put his finger on the loss.

The only way to learn of such losses is to have a report of each job which sets forth in the plainest manner possible the time and material used on that job and the cost of the materials. Such a record is very easy to compile and its value can only be estimated by the value the owner of the shop puts on his business as a going concern.

Many maintenance men today are losing money on simple jobs because they think they are charging a profitable price when, in fact, they are charging less than the job costs them. All material figures in these costs should be charged at retail prices. The shop owner would not think of selling an article



over the counter for cost, why should he sell it through his shop at cost?

There is only one answer, he should not.

Then there is the cost of supervision on a job. Recently a maintenance shop owner could not understand why his shop did not return a suitable profit. An examination into his methods showed that he was charging a fair price, with a profit for the labor supplied, that he was charging a fair profit on the materials. He had figured his overhead, including rent, light, heat and some allowance for waste and interest on his investment in tools, equipment and things of that kind.

But he had not charged anything for his own time.

All of his profit charges were conservative, so there was nothing in the cost to pay him a salary, and, consequently, there was no cash for him when the weekly account was settled up. This particular shop owner was a good mechanic and was active on nearly every job that came into his place. But he was not charging for this time, nor for his knowledge of the work which was an important factor. A later examination into his methods revealed that he was not charging for depreciation of his tools.

It was going to develop very soon that his tools and equipment would wear out and he would have no money to buy new ones. He did not notice this particularly while only small tools were wearing out, but he would be brought up with a halt when an article of equipment that would cost \$100 or more to replace went to the junk heap.

A usual fault with maintenance shops today is that they do not keep the men continually at work. It is quite interesting to add up the time slips of an employe and learn that although he has been paid for nine hours' work, the records show that only seven hours have been charged to the customers for whom he worked.

The piece work system is the eventual solution of this problem, but until the shop owner is ready to install the piece work plan, the best that he can do is to keep the men working steadily by proper routing of work and then checking up on the work slips as returned to the office and see that they have made the proper charges against customers.

Such records as these, when sorted as to particular jobs, make the basis of a flat rate system. Also they form a proper basis for comparing the work of the mechanics. Perhaps one







mechanic is taking twice as much time for a particular job as another. Why? Ask the men, watch them at the work and see what the slow one does not know that his faster associate does know.

**Keep shop records that will show the use of material.**

Here is the greatest leak of all, perhaps. Anyway, it is one of the most frequent reasons why maintenance dealers, and some car dealers, do not make money. Last year the manager for a dealer establishment caused the records of a branch salesroom to be checked up. He found losses in the various departments amounting to almost \$4,000.

One loss exceeding \$400 was in oil. The only reason that there was such a loss was that the oil tank was of easy access and there was a cup nearby and everyone who wanted oil helped themselves. The tire department indicated a loss exceeding \$600. In some cases there were notations of to whom the tires were delivered but no indication as to why they were taken out. In the accessory department there was a loss of almost \$1,000.

The strangest part of this situation was that there was no suspicion on the part of the management that these goods disappeared through dishonesty. The branch manager immediately placed wire around these supplies, locked the gates and put a youth in charge. Within two months indications were found as to where the materials that were missed the year before went. After these two months, the manager was even more certain there was no dishonesty and that practically all of the materials had been honestly used, but the use had



not been reported. As a result, the management had no direct information on how to charge these materials.

If you do not keep an exact record of all of your parts stock, accessories, tools and other materials that are useful both in the salesroom and the shop, there is not a chance in the world for you to know where and how this material was used. As to tools, if the mechanics are not obliged to account for them, the chances are that a good many will be carried out of the shop in customers' cars through carelessness.

Many a dealer has wondered when it was reported that his roll of brake lining was gone where it went and his next move was to wonder what had become of the roll of fan belting. Are you one of these?

Why not collect for this material? It should be a part of the profits.

Recently a dealer who has a very large maintenance department was amazed on the yearly total cost of sandpaper, cotter pins, small bolts shown to have been purchased. He did a little figuring. His figures indicated that he had bought almost enough cotter pins to have entirely replaced the cotter pins on all cars that had been in his shop. He knew that this was not true. So he began to pay attention to small details of this sort. Now when a mechanic goes to the store room, he gets just as many cotter pins as he needs and he tells what



job they are for. The sandpaper is bought in large rolls and a piece large enough for the job in hand is cut off.

The savings in these neglected small articles in this shop would make a nice profit for some small shops.

All of the suggestions contained in this article have been printed in *MOTOR AGE* previously. Doubtless all of them will be printed again. They are not great discoveries, they are merely fundamentals.

It is a mighty good thing for a dealer to look himself over once in a while and learn why he is not making money, or making as much as he should. Usually the reason will be found in some very simple and easily found cause.

Today the man who is conducting an automotive business according to the primary rules of carefulness and honesty, with an intelligent sales campaign, should make money. The field is here. The opportunity is greater than the capacity of the present dealer and maintenance equipment. The problem that remains is to win the confidence of the owner of the automotive vehicle.

## Facts About Postoffice Department's Motor Equipment

WILMINGTON, Del., July 30—In addition to telling how the motor truck had enabled the Postoffice Department to extend the service, especially in the rural sections of the country, Harry H. Billany, fourth assistant Postmaster General, in an address here before the Rotary Club, gave some interesting information regarding motor equipment and economies.

"The United States mail trucks which you see on the streets every day (there are 14 in Wilmington)," he explained, "are part of the motor vehicle service of the Postoffice Department. In this divi-

sion (motor vehicle) we are operating in 344 cities, with 4,115 trucks and 4,067 employees. For these trucks we buy annually 42,000 tires, 8,000,000 gallons of gasoline and 244,000 gallons of cylinder oil.

"The appropriation of \$15,000,000 for this service was the same in the year 1921 as in 1922, yet we closed the fiscal year, June 30, 1922, with a surplus of \$400,000, notwithstanding that we had an increase in the service in 78 cities.

"This saving was accomplished in several ways. The system of allowing

each postmaster to purchase his supplies locally has been discontinued. All supplies are now purchased through the Supply Division. We have now standardized on eight makes of trucks, whereas formerly there were 32 different makes and types. Central repair units have been established, thereby very materially reducing the cost of repairs. While the painting of the trucks seems to be a small item, yet we are saving annually \$75,000 by changing the color from red, white and blue to olive drab."



## New Car Offerings of Three Companies



*New seven-passenger Hudson sedan with aluminum body selling for \$2295 f. o. b. Detroit. On the new Hudson sedan body, the seats have been rearranged for greater comfort and there is more knee room between the rear seat and the auxiliary seat*

### Hudson Sedan Has Aluminum Body

Hudson has added a new seven-passenger sedan with practically an all aluminum body. It is 3 in. lower and of lighter weight, with wider front and rear seats. All the body panels are of aluminum. The 3 in. increased length has been given to both the front and rear compartments, particularly between the rear and auxiliary seats to give greater knee room at this point. Additional space has also been given the driver and the front seat, designed along the general lines of the Hudson touring limousine, has been laid out to give greater comfort to the driver. The contour of all the other seats has also been changed to afford an easier seating position and the rear seat is deeper.

Better ventilation than on previous models is provided for by a larger cowl ventilator equipped with a deflector. The rear window glass is larger and the tri-

angular panes of glass which form part of the windshield give the body a longer appearing effect, as well as affording the driver a greater range of vision.

The upholstery and rugs are of deep blue. The interior accessories include rear quarter shades, dome light with switch so located that it may be reached equally well from the front or rear compartment, smoking set, rear vision mirror, etc. All the doors have four hinge supports and entrance to the body has been facilitated by increasing the width of the doors.

The rather unusual design and construction of the cowl and windshield is said to have eliminated all chances for rattles or squeaks at this point. The semi-circular shape of the top of the cowl adds a distinguished look to the sedan, especially in conjunction with the triangular shaped side windows. Plac-

ing the triangular windows at an angle makes it easier for the driver to observe traffic and road conditions, inasmuch as the glasses are directly in line with his vision. Drum type side parking lamps at the base of the windshield are standard equipment. The body panels are finished blue and the chassis black. This car is priced at \$2,295 f. o. b. Detroit.

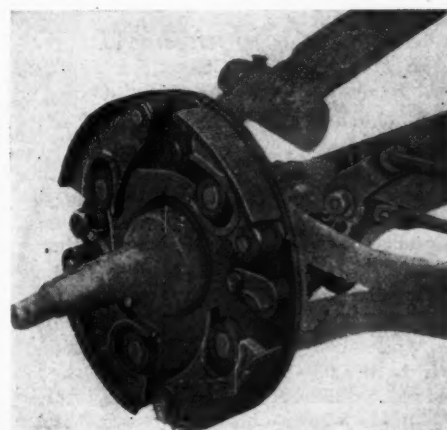
### S. & A. Internal Brakes for Fords

A FULL floating brake, that is, one wherein the brake shoes adjust themselves to the wear in the facing or to an out of round brake drum, has been brought out by the S. & A. Brake Co., Chicago, Ill.

The brake is made for Fords, and is intended to relieve strains on the transmission and other drive members by virtue of the fact that all the braking is done on the rear wheels. The shoes, of which there are four, are actuated by a cam working on roller bearings. There is sufficient play in the central opening of the cam around the axle to permit the shoes adjusting themselves to the contour of the brake drum.

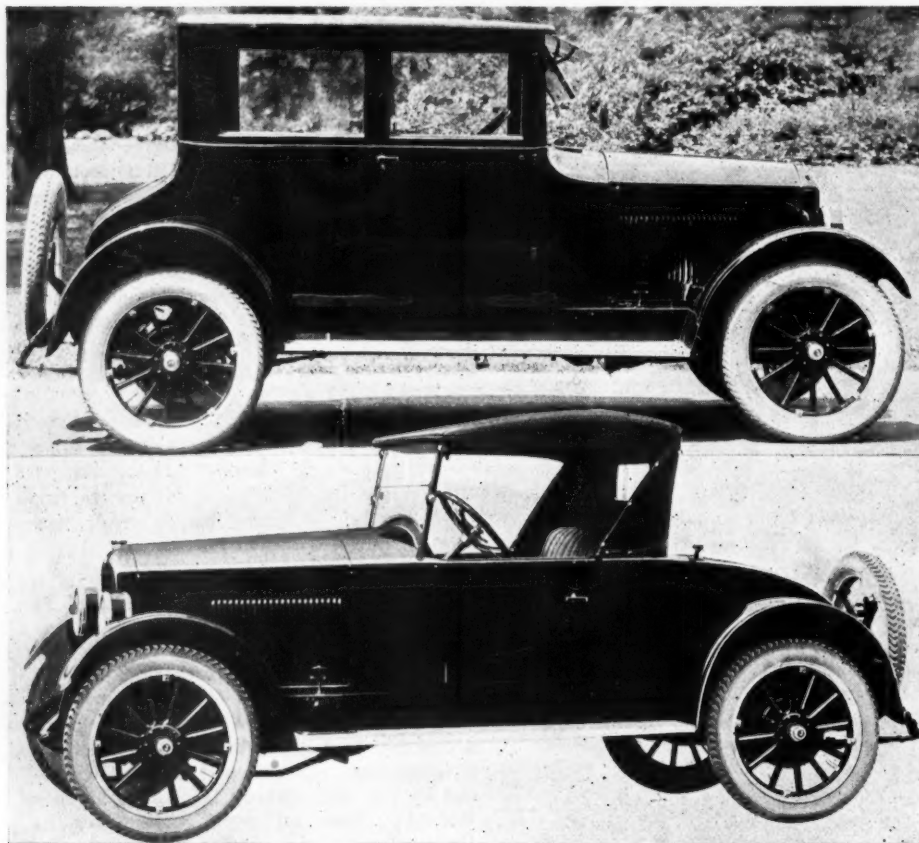
The spider which carries the shoe actuating rollers as well as the entire support plate upon which the brake functions are steel stampings and wherever necessary, parts are heat-treated and ground. The mechanism is treated with a zinc alloy to prevent rust. In installing the brake is bolted into position by two bolts which take the place of the radius rod bolts, a filler washer is supplied to fit under the bolt head used in holding the Ford emergency brake. The brakes are furnished with an equalizer of the ball and socket type and an extension lever is clamped over the standard Ford lever, which takes the pull rod for the S. & A. brake and also the standard Ford emergency rod.

The entire breaking system operating from the foot pedal or Ford emergency lever, independent of each other, sells for \$20.



*S. & A. Internal Brakes for Fords*

## New Jewett Coupe and Roadster



*Jewett four-passenger coupe and roadster. It is stated that the passenger space in the coupe is as much as in the 6-66 Paige*

A new four-passenger coupe has been added to the Jewett line. This car has been designed to give a full four-passenger capacity. The body is 48 in. wide and from the dash to the rear window measures 77½ in. In fact, it is claimed that the passenger space in this new Jewett coupe is almost as much as in the coupe on the big 6-66 Paige model. The two-passenger rear seat is 36 in. wide by 19 in. deep.

For the fourth passenger, a well up-

holstered folding arm chair is provided measuring 14½ by 14 in. This seat has 23¼ in. of leg room. There is a rear deck which provides space for two bags and a suit case, leaving addition to this sufficient space for a golf bag. The coupe sells for \$1,395 f. o. b. Detroit. A roadster has also been one of the recent additions to the line. This has also been increased in roominess and now has a 45 in. seat with new side curtains.



*Greater room is the feature of the new Jewett Coupe—and comfort. For the fourth passenger, an "arm chair" is provided as shown. This addition to the Jewett line sells for \$1,395, f. o. b. Detroit. The roadster shown at the left is also featured by additional room*

and of good appearance in contrast with the painted body panels. The body color is blue, the fenders and chassis being black enameled.

At the rear is a platform for a trunk, protected with maple slats in natural finish. The rear body panel is also protected by nicked slat irons; and at slight extra cost, a trunk is furnished. The Earl trunk contains two large suitcases and a hat box. Besides the trunk, special equipment includes Boyce motometer, and front bumper, these three items being furnished at a net cost of \$50.

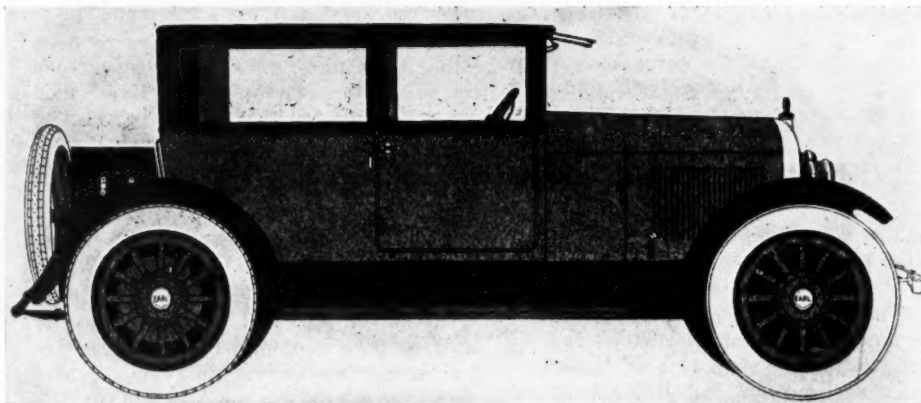
For convenience in entering, the front seats tilt forward, and the backs fold down. The front seats, themselves, are 18 in. wide, 18 in. deep and 12 in. from the floor, with a comfortable 3 in. pitch. The rear seat, which is 45½ in. wide, will seat three persons without crowding. This cushion is 18 in. deep, 14 in. from the floor, with a pitch of 4 in.

## New Earl Cabriole

The new Earl cabriole is patterned after the company's brougham, but is reduced in cost, owing to well planned quantity production. The price is \$1,395 f. o. b. factory, Jackson, Mich. The illustration of the cabriole has been reproduced from the designer's drawing.

The cabriole is essentially an all-weather car. The plate glass rear quarter windows can be lowered, and the door windows manipulated instantly. The windshield is of the standard Earl one-piece construction, and swings either in or out, thereby affording ample ventilation. The rain and sun visor is standard equipment. The upholstery is of grey Spanish leather, and the interior finish is of the same material. Other standard equipment includes dome light, windshield wiper, and complete set of tools.

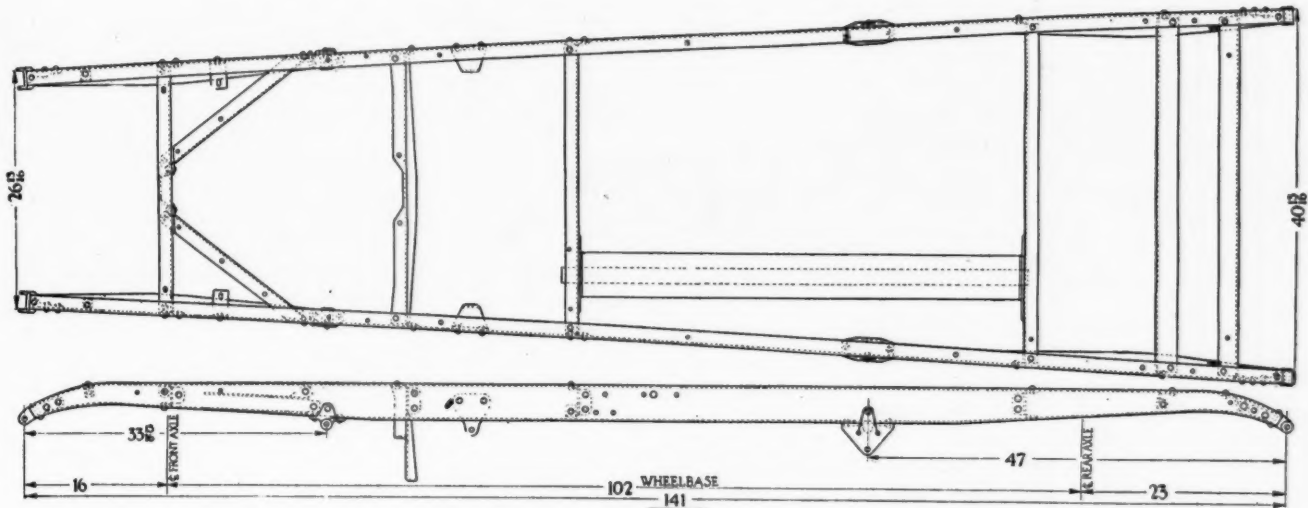
The top and sides of the rear tonneau are covered with black duratex fabric, which is weather-proof, easily cleaned



*Designer's Drawing of New Earl Cabriole which sells for \$1,395 f. o. b. Factory, Flint, Mich.*



# Structural Details of Star 4-Cylinder Car

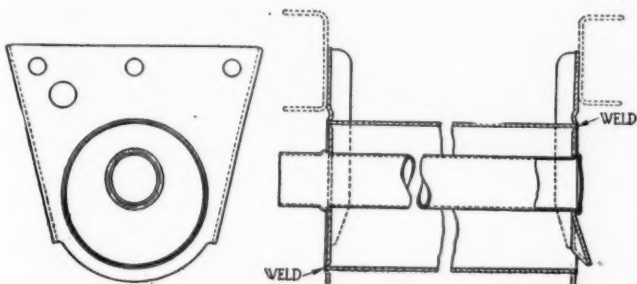
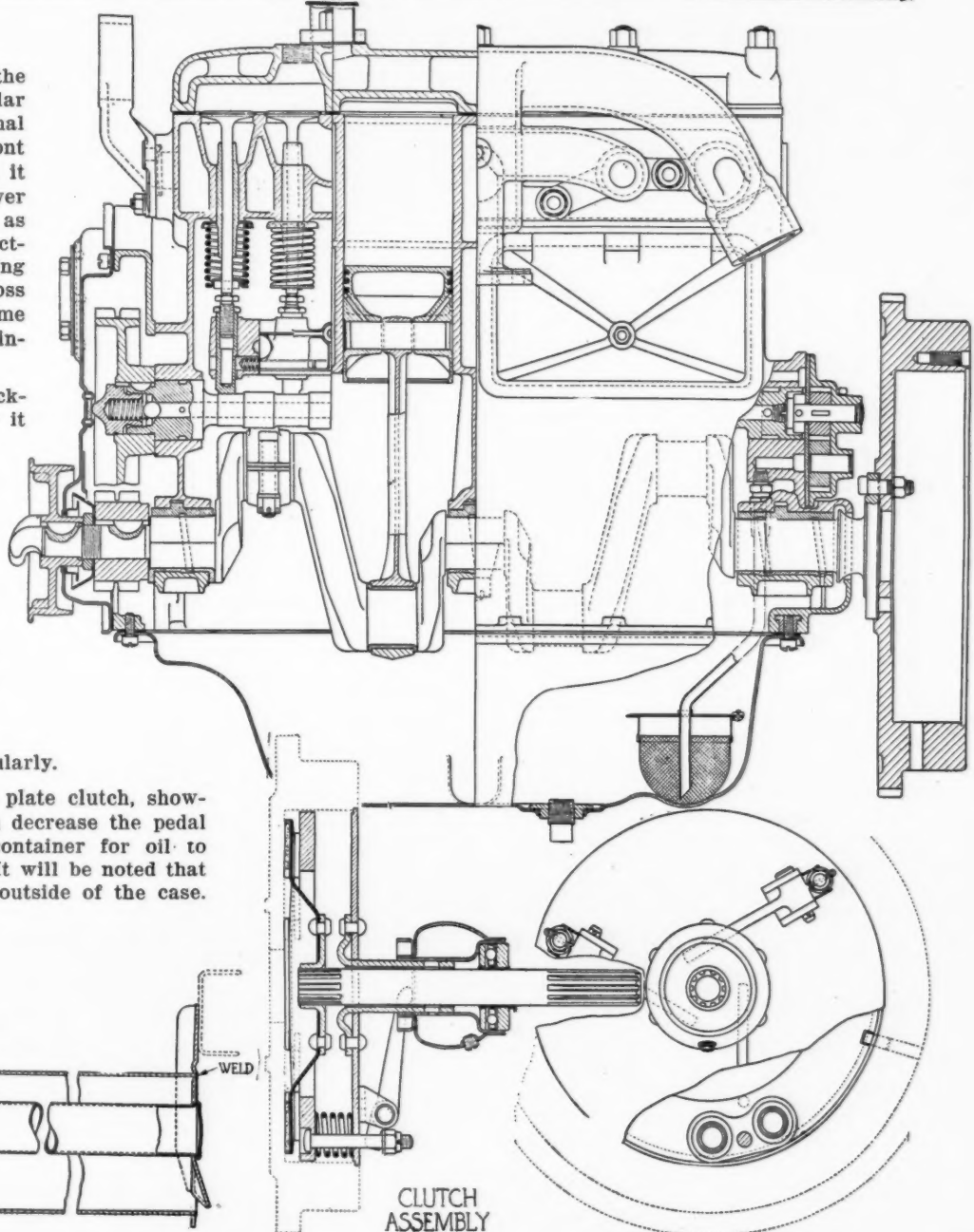


Details of the frame, showing the relative position of the tubular "backbone" and also the diagonal braces upon which rests the front end of the engine. This makes it very easy to remove the power plant when necessary, inasmuch as the crankcase arms are not obstructed. The tubular member running from the third to the fourth cross member serves to give the frame unusual torsional strength and incidentally is the muffler.

A close-up of the tubular "backbone" and muffler, showing how it is welded to the plates or hangers in turn are fastened to the cross members. This type of frame construction is said to very materially reduce twisting of the frame.

Longitudinal sectional view of engine, which gives a good idea of the general layout. The large bearings on both crankshaft and camshaft should make for long life of these parts. The camshaft and accessory shaft are driven by chain, arranged triangularly.

A sectional view of the single plate clutch, showing the disengaging levers which decrease the pedal pressure and the sheet metal container for oil to lubricate the throwout bearing. It will be noted that the clutch adjustment is on the outside of the case.





# Report on Pirate Parts Situation

[From "Service Bulletin" published by The National Automobile Chamber of Commerce.]

O. C. HUTCHINSON (Dodge), chairman of a special committee to investigate the Pirate Parts Situation read the following report at the members' meeting of the National Automobile Chamber of Commerce, June 8, 1922:

Pirate parts as here discussed will include not only such as are so defined by law, that is, those which infringe patents or are misrepresented as the genuine, but all those substitute or replacement parts that are not like the original used by the manufacturer or authorized by him. A better name would be unauthorized parts. These may be divided into three classes:—I, Strictly Pirate Parts; II, Low-Grade Unauthorized Parts; III, High-Grade Unauthorized Parts.

Competition from unauthorized parts of all kinds is a disadvantage to the industry, but, only when it is also a disadvantage to the user, can we reasonably expect sympathy and co-operation from the trade and public in antagonizing such traffic. All Class I and II parts, it can be shown, are against the car owner's best interest, so that educating the public to this fact will accomplish much.

## Non-Pirate Unauthorized Parts the Real Problem

Further the unfair competition of Class 1 (pirate) parts can be restrained by law. This class, however, does not present the most serious menace nor does it represent the largest volume.

The unauthorized parts that are not pirates, Classes II and III, are the hardest to contend against because trade in them is not illegal; it is more difficult to show the public the disadvantage of using them, and our own dealers are the worst offenders in buying them. It is this competition that needs the manufacturers closest study.

Dealers claim they would not use Class II parts—those that are inferior yet not pirates—if manufacturers priced parts right and had adequate distribution. It is largely a matter of educating the dealer to the importance of co-operation with the factory for his own protection. Many factories have used bulletins and letters to their dealers to explain to them the importance of adhering to the use of those parts that the factory has found to give the best service in their particular product and to warn owners against the use, or allowance of the use of any but original parts, because of its invalidating the guarantee.

## Where the Keen Competition Enters

Class III parts include those that are equal or superior to the original. If, in addition, the latter are sold for less than the genuine, the car owner is bound to consider it to his advantage to use them, and it would seem to be the car manufacturer's place to strive to learn how to equal their quality and meet their price. When it is to the public's interest to use such parts, it is almost fruitless for manufacturers to put forth effort and advertising expense against them, or seek to dissuade dealers and owners from using them.

The strongest competition comes from such of Class III parts as may be regarded as equal to the original but cheaper in price. The producer generally has less overhead because he concentrates on parts that are most in demand, whereas the car manufacturer has to carry all parts that may be wanted and so, having many slow-moving parts, has a larger overhead. It is this competition that is hardest to meet.

## The Market for Unauthorized Parts

There may be some parts that could be priced closer if the manufacturer realized the importance of studying ways to reduce the cost so that this outside competition might not get a chance to start.

The independent repair shops and garages afford the greatest market for unauthorized parts. If a more attractive price

is offered than can be obtained by buying from the factory's distributor or dealer, naturally the repair man turns to the cheapest source, feeling less concern about the reputation of the car than the authorized dealer or the factory. To meet this situation there have been very earnest representations from individuals and organizations that it is highly important for the factories to enable dealers to give material discounts on parts to independent repair men.

## Independent Repairmen Want Repair Parts Discounts

Among the most recent of the latter was a resolution passed by the Los Angeles Trade Association and transmitted to the Chamber by the California Automobile Trade Association, declaring that most automobile manufacturers allow so little discount on repair parts that local distributors and dealers cannot give a discount to legitimate repair men, driving the repair men to purchase imitation or pirate parts to the ultimate harm of the motor vehicle manufacturers. In his letter accompanying the resolution, Secretary Robert W. Martland, gave it as his opinion, that, "unless a discount on standard manufactured parts is given to legitimate repair men, the pirate companies will control the situation in California."

About the same time the Intermountain Automotive Trade Association of Denver circularized the manufacturers, declaring that the only way to eliminate the pirate parts evil is for them to allow a greater discount to distributors so that they in turn can give independent repair shops a fair discount.

Some doubt the efficacy of this as a remedy, believing that instead it will aggravate the disease. Assuming that the manufacturer has priced his parts as low as possible in the beginning, he must raise his list prices in order to give the distributor a larger discount, which will have the effect of increasing the cost of parts to the car owners, tending to drive them to the pirate part market.

## Remedies for Pirate Parts Evil Summarized

When the manufacturer has made his parts prices right, distribution right and his discounts right, the rest of the job is education. This must reach the dealer, the owner and the independent repair men, or the public in general, and cover why the manufacturer knows best what parts should go into his car or truck, why he should be able to turn out the best in quality for a given price and why the use of an inferior part may be dangerous or at best expensive and uneconomical.

Our attorney, Charles Thaddeus Terry, says, protection is only possible if our manufacturers plainly mark every part likely to be pirated with a copyrighted identifying mark and warn against the use of all others.

## U. S. Leads World in Automotive Exports

The United States leads the world in the export of motor cars and motor trucks. Forty per cent of 1021 automobile exports came directly from the factories in the U. S. A. Ten per cent more were exported from U. S. branches in Canada, and the bulk of the 25 per cent exports from France were re-exported U. S. war vehicles. Nine per cent of this business was done by Italy, 7 per cent by Germany, and 4 per cent by England.

## Postmen With Cars Draw Higher Pay

The average annual pay of rural postmen using motor vehicles is \$2,570, as compared with \$1,830 for those using horse-drawn vehicles, according to the latest report of the Postmaster General.

## London Has 1600 Safety Zones

London has 1,600 safety traffic zones, reports Inspector Edward H. May, Chief of the Division of Traffic, Cleveland, Police Department, in a recent issue of the National Safety News. Inspector May believes that the London custom of having street cars stop on the near side of the street, a practice observed in many American cities also, is helpful to traffic.

# WHAT IS A FLAT RATE?

## *and WHY?*

*On This Page Are Presented Some Arguments for the Idea of the Flat Rate, Not for the Details as They Constitute a Separate Question*

**W**HAT is a FLAT RATE? and Why? This dual question is attracting much attention in the automotive industry and there appears to be almost as many answers as there are men. Even the factory service managers have difficulty reaching an understanding that will serve as a basis of discussion. One factory service manager said recently that he could think of a FLAT RATE only in terms of an operation costing the same in every section of the country.

An equipment jobber recently denounced the FLAT RATE as moonshine and said that it was foolish to think of charging the same amount for grinding the valves on a Ford and a 12-cylinder Packard.

### *Better Definition Later*

After giving due consideration to the above comments, how can one expect the maintenance dealers of the country to become a unit on the idea. They may get a fairly clear grasp of this innovation from the business papers and then become confused by conversations with factory representatives and others who call on them.

The trouble appears that technical men are looking for a too technical definition of an idea. An idea cannot be defined within the tolerances that are used in manufacturing today. Sooner or later the FLAT RATE idea will become practice and then a better definition can be worked out.

Until that time arrives, the idea must be accepted more or less in the abstract. The definition will come with practice. There would be no discussion today in a group of grocery dealers as to the meaning of selling by weight, and yet there are many kinds of scales in use. In this case the theory has developed above the details. In the question of the FLAT RATE there is too much effort to settle all of the details first.

There is no mystery about the FLAT RATE practice of the jeweler who tells you what a new mainspring will cost for your watch. This is accepted practice. Why not apply this practice to our business?

More than anything else, the FLAT RATE is a suggestion which, if put into practice, enables the maintenance salesman to tell his customer what the job will cost. A good salesman is required. He must be able to determine what is the matter with the car and to convince the customer that he knows. He can make this price conditional upon the need of certain parts. It really does not matter whether he quotes the price of the job complete, or for labor and parts separate.

### *Selling the Idea*

It is not the practice that is important, but the idea. The idea in this case is to let the customer know before the work is done, what it will cost. This avoids the unpleasant discussion and adjustment when the customer is surprised and disgusted at the price named after the work is completed.

There are many successful FLAT RATE maintenance men in this country. Some of these men operate washing stands,

others greasing stations and a smaller number specialize in brake lining jobs. These may seem to be of little consequence, but they are setting the pace.

The newest class of FLAT RATE operators are the cylinder regrinders. What dealer would send a job to be reground unless he knew in advance what it would cost? He demands that price from the man he patronizes, but he is not willing to treat all of his customers by the same rule.

FLAT RATE figures are obtained in only one way—by experience. There are two methods of gaining the experience: By a definite motion study and the charting of the operations as a guide for the mechanic, or by averaging the price charged for similar jobs in the shop.

### *Averaging the Prices*

The larger maintenance establishments are working along the former practice and some elaborate studies have been completed. To apply a study of this sort, the dealer must have the same facilities and equipment as the man who made the study. The mechanic must work by note, just as a singer must be governed by notes. Motion study is an accepted practice in many large factories and probably will become an accepted practice in many large maintenance establishments. Long steps in the standardization of equipment must come first.

The other method is the practice of many smaller shops. It is like this: All of the brake relining jobs are copied from the cars and classified as to cars. These jobs have been charged for under the old practice of charging for labor and materials. Say there are ten such jobs for each of the cars A, B and C. The A prices are added and divided by 10 to get the average. That average becomes the price that is quoted to the next owner of an A car who comes for a brake relining job. The same is true of the B and C operations. If the average is the same, then two cars are grouped. Practically all shops where sufficient records are kept to know how business is going, supply sufficient material for a flat rate schedule on the cars in that community.

The advantage of the first method over the second is that it often eliminates wasteful methods on the part of the mechanic. However, most FLAT RATES worked out for the big shop cannot be applied without modification in the small shop.

### *Some Advantages*

The advantage of a satisfied customer has already been spoken of. There are numerous other advantages. Sooner or later the mechanics will shorten the time on some of the jobs. Competition will show where your prices are high and some study of the work will show why. The timing of these operations shows exactly what gain there is in the use of equipment.

It appears to be more than passing strange that the factory engineers and service managers have not paid more attention to FLAT RATE schedules. The day is here when maintenance is a big factor in the sale of cars, and it is increasing as a factor every day. The factory service manager who wishes to impress his engineers with the inaccessibility of the vehicle



the engineers have turned out, has no more accurate or effective method of doing so than to show him the FLAT RATE schedule for the same operation on competing cars.

It is a fact that certain repair operations, usual ones, vary greatly in the results of such tests. Factory service managers are apt to complain that the engineers do not pay much attention to them when they make their complaints as to inaccessibility of certain parts of the car. If that service manager will discuss with the higher ups of the company the importance of maintenance in continued and repeat sales, and will then show to them how much more time is required for standard maintenance operations on their car than on those of competing lines, it would be only a few days until his office would be filled with engineering department employees seeking suggestions.

### *The Replacement Sale*

There can be little question that the replacement sale is the best sale of the future. There can be no question as to the owners exchanging information as to what it costs them to get the rear main bearings of the crankshaft attended to, or what it costs to get the clutch relined. A recent list of FLAT RATE prices for brake relining, shows that one car, by a change of model, increased the price of relining the service brakes \$2 and the emergency brakes \$3.50. Perhaps there is a proper explanation for that increased burden on the car owner, but it may require a lot of explaining to a curious man who does not understand the construction.

The dealer should be interested in the FLAT RATE because it will reduce his overhead. It has never failed where the idea has been intelligently applied. In a Minneapolis establishment the application of FLAT RATE to all jobs increased the receipts of the maintenance department about 50 per cent, without additional mechanics or overhead increase. It was brought about in this way:

The men were informed that the time on each job was so many hours and minutes and that there was a premium for the man who did the job right in less time. A spirit of rivalry entered into the operation and when one man had reduced the time for doing a certain job, another mechanic was sure to set out to beat that record and, incidentally, get a division of the money saved for the firm.

### *Lowered the Prices*

After the flat rate work had been under way for several weeks, the dealer revised his prices to the customer and lowered the time limit on the jobs. The new scale permitted the men to make slightly more than the regular wage on the original scale and they made no objection, when shown that the saving was going to the customer.

In another shop employing more than 100 mechanics, a piece work schedule was worked out along with the flat rate for the customer and both were introduced in the shop at the same time. Instead of trouble with the mechanics, the change was hailed with rejoicing. The men instantly saw the opportunity for larger weekly earnings. Indeed, some men earned two and some three times as much as under the weekly fixed wage scale. It became necessary in time to readjust both the

flat rate schedule for the customer and the piece work schedule for the mechanics in this shop but no trouble resulted. The men were perfectly fair in their attitude when they learned that the savings were being passed on to the customers.

In this shop the amount of work turned out was practically doubled without an increase of overhead and a practical elimination of troubles in the sales room.

### *Turn About of Attitude*

This shop worked only on one make of car and more than 90 percent of the work was put on FLAT RATES, with the same percent of piece work in the shop. The manager of this shop said that an important development was that previously there had been 100 mechanics working under one foreman; after the piece work was installed, the one foreman was working for 100 mechanics. The change absolutely eliminated the loss of time in changing from one job to another and when the assignment clerk found that he was charging standing time because jobs were not assigned, he quickly got ahead with the assignments.

The mechanics were interested in lowering time records because it meant more money for them. Each of them began planning special tools that would speed up his work and it was nothing uncommon in that shop for half a dozen men to stay after hours to work out some tool that he thought would aid his work.

These are only a few general thoughts on the FLAT RATE situation as it exists today. There is a great need for the acceptance of a broad definition and then for each maintenance department to work out the details in his own peculiar way.

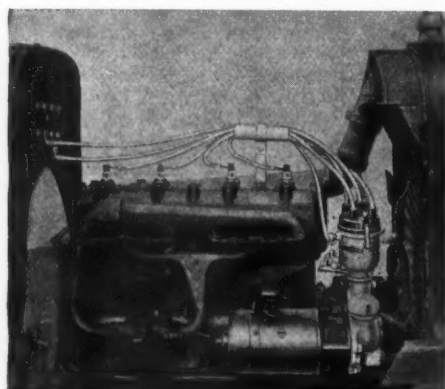
### *Where to Standardize*

The only standardization that should be sought is that of efficiency. It would be foolish for any factory executive to hold off because he cannot make the same rate in all of his dealer territories. Overhead is not the same in all communities, wages of helpers are not the same. The maintenance problems are not the same. Climate and roads have an influence on the details.

The experience of fixed prices for the entire country during the war were sufficiently disastrous to disarm critics of regional prices. Hoover's national prices were all right for emergency, but how quickly they were dropped when the emergency passed. Hoover found that it was necessary to put the prices sufficiently high to enable the inefficient mills in many older lines to produce at a profit to encourage production. This gave to efficient mills enormous profits.

### *Customer Satisfaction*

The FLAT RATE must succeed, and it will succeed, by its fundamental fairness to the customer; a considerable part of which is putting maintenance prices on a basis whereby the vehicle owner will know whether he is being over charged. Under the plan of making up the bill after the work is done, the vehicle owner did not always know just what has been done to his car and a good deal of the success of some maintenance men has been their ingenuity in beclouding their customers with words the customer did not understand.



### **BOSCH ANNOUNCES LOW-PRICED FORD IGNITION SYSTEM**

**A** BATTERY ignition system for Fords, in which use is made of one of the regular Ford vibrating coils, has been placed on the market by the American Bosch Magneto Corp. The system sells for \$19, which is much cheaper than the magneto fitting which this company has been furnishing for Fords. The fact that a Ford coil can be used makes it unnecessary to use the Bosch coil designed for this outfit.

With the outfit the Bosch starting amplifier is furnished.

This instrument is mounted on the

dash and operates in connection with one of the Ford coils. It has a button which the driver presses when about to start the car. This enables the system to furnish a much bigger and hotter spark for starting than that regularly supplied at starting speeds. This new ignition system employs the Bosch compensating governor and standard timer-distributor.

### **Motors Three Times Horses in Shanghai.**

Motor vehicles in Shanghai number 2,500, more than three times the total of horses, according to the Shanghai Sunday Times. Coolie-drawn rikshas, however, are the most popular type of equipment, totalling 16,000.



# Oregon Dealers Gather Figures to Prove the Extent of Industry

*State Association Will Talk to Legislators and Other Lines of Business With Definite Statements as to Value of Business to Commonwealth*

Portland, Ore., July 22.

**I** NTERESTING figures showing the magnitude of the automobile industry in Oregon have been compiled by Ralph J. Staehli, secretary of the Automobile Dealers' Association of Portland, and this wide-awake dealers' organization, fortified with this surprising array of facts, has started upon a determined campaign to win state-wide recognition of the importance of the business it represents.

The dealers propose to "sell" their industry to the whole state. They want the farmers, the laborers, the professional men and women, and especially the state representatives and senators and all officialdom, to know and appreciate what the automobile industry means to the prosperity of the state from the standpoint of capital invested, wages paid and the volume of business.

Capital investment in the automobile industry in the state was found to be \$56,882,678.90, the annual pay roll \$11,490,239.50 and the volume of business last year \$85,666,600.40.

These figures and others shown in a table herewith were arrived at by carefully checking and comparing answers to a questionnaire sent out to all automobile agencies, garages and supply stations in the state. Several months were required to send out the questionnaire and get replies. Comparatively few of those to whom questionnaires were sent failed to respond and the association believes that the compilation is remarkably accurate for those lines of business directly connected with selling and maintaining automobiles and trucks.

## Proper Recognition of Industry's Importance

No attempt was made to include the business of the oil and gasoline service stations, automobile stage and bus lines and private garages and fleet service stations. It is pointed out that the survey of employment was made at the slack time of the year and that if it had been made at the busy season the annual pay roll would have been in the neighborhood of \$16,000,000 to \$18,000,000.

This much of the work is only a part of the plan of the Oregon dealers to make it very plain to the people of Oregon that this industry is one of the things that must be looked up to.

These figures compiled and published in various ways will for the next six months form the subject of a campaign directed to legislators and officials who will have much to do with the next session of the Oregon legislature, taking place in January, 1923.

The automobile dealer in Oregon today has a dealers' license plate that has become practically useless. When in the future the dealer speaks for something affecting vitally his own industry and welfare, it is very probable that the legislator will treat this request with more consideration than he has in the past.

The city of Portland has spent millions of dollars in developing port and terminal facilities. As a result of this, the total exports last year resulted in a business of \$69,129,000.

Yet the automobile business in 1921 amounted to \$85,000,000.

Portland has become the northwest's most important distributing point for automobiles and automotive equipment.

Factory branches and the home offices and warehouses of the northwest's larger distributors in these lines have brought to Portland a volume of business that is of untold value to the community.

Through the efforts of the dealers' association the town and state are going to learn what this means to them. Coming at a time when the railroads, particularly, are active propagandists in Oregon, the campaign will be particularly valuable as in the whole state such effort on the part of various organizations is focusing interest on issues.

The campaign of the dealers has the following general lines:

1. Having collected the material with which to supply its

campaign in the way of statistics and general information, the first step will be in acquainting the industry itself with its own importance. This will be done through educational work in sales conferences and bulletins posted in shops and salesrooms and active discussions at meetings of the Automobile Dealers' Association, the Portland Automotive Trades Association and the tire clubs.

2. A general publicity campaign from the secretary's office has already been started. Every newspaper in the state has been supplied with an article giving the general figures covering the business. The campaign at this time contemplates no use of paid space. It is considered informative enough and live enough to warrant reasonable use by the newspapers. To date they have accepted practically everything issued as news without question. Where necessary, the matter is furnished to local dealers and through them publicity is secured.

3. The third step in line with the general publicity is the use of personalized messages linking with dealers' advertising the facts and figures produced by the survey of the trade in Oregon. Stationery, envelope stuffers, blotters—where the dealer has any such material—carries some terse statement gleaned from the reports made by R. J. Staehli, secretary of the association.

4. The fourth step in the work is putting the message over

## Automotive Investment in Oregon

**T**HE following tabulation shows the extent of the automobile industry in Oregon, as compiled by the Automobile Dealers' Association of Portland, of which Ralph J. Staehli is secretary. The figures include salesrooms, automobile agencies, maintenance shops, battery stations, tire stations, accessory stores and the stocks and equipment involved in their operation, but does not include the property or equipment of the oil companies devoted exclusively to the servicing end of the automotive industry. Separate figures are given for the city of Portland and the rest of the state.

	Portland	Rest of State	Total
Capital invested—			
Real estate .....	\$29,188,400.00	\$10,155,908.50	\$39,344,308.50
Equipment .....	2,558,507.55	1,521,267.02	4,079,774.57
Stocks .....	6,837,665.15	6,620,930.68	13,458,595.83
Total investment ..	\$38,584,572.70	\$18,298,106.20	\$56,882,678.90
Weekly payroll ...\$	98,350.20	\$ 118,615.50	\$ 216,965.70
Annual payroll ...	6,060,162.00	5,430,077.50	11,490,239.50
Volume of business	35,268,511.00	50,398,089.40	85,666,600.40
No. employees .....	3118	2740	5858

with the officialdom of the state. From now until the end of the year they will be regularly bombarded with letters, sometimes from the association and sometimes from their dealers in their own community, who will make it apparent to them that a \$60,000,000 investment deserves more consideration than it has had in the past.

5. The final step is the personal contact between the association, civic clubs and local governments. Meetings have been arranged with various civic clubs at which phases of the business will form the meat of their programs. In the week just passed dealers of Oregon met with the secretary of state and laid plans for needed revision in the Oregon Motor Vehicle Code.

A detail revealed by the survey was that factory branches and property owned in Portland by companies outside the state are valued at more than \$3,000,000. It was also calculated that automobiles in the state pay in direct property taxes and in taxes on real property and taxes devoted to its maintenance about \$1,000,000 in addition to the various licenses and fees.

Further analysis of the figures led to the conclusion that for every automobile in service in the state there is approximately \$840 invested in garages, service stations and stocks of supplies and accessories.

Co-operation upon the part of all dealers and others interested in the industry is relied upon by the association to make this educational campaign a success.

## Kansas City, Kas. Provides Free Camp With Many Conveniences for Automobile Tourists

THE city commissioners of Kansas City, Kas., having become convinced that facilities should be provided for motor tourists, immediately provided those facilities. Seven acres of ground were set aside, in the city limits, on the west side of the city, and on a paved highway—the King of Trails which at this point is also the Victory Memorial Highway. The grounds were enclosed in a high wire fence, and a handsome entrance provided, on which is the announcement that it is a “free” automobile camping place.

Kansas City has gone the limit in providing facilities for campers; they could do the job right, for the whole project was designed, on bare ground, for this specific purpose. Three buildings have been erected, and furnished. Two of these buildings are joined by a roof, under which several cars can be sheltered. One of the buildings has a lounging room 25 by 25 feet, with a fireplace; chairs and lounges; and with lavatories and shower baths for ladies and men. Hot water is provided, from a large tank heated by electricity.

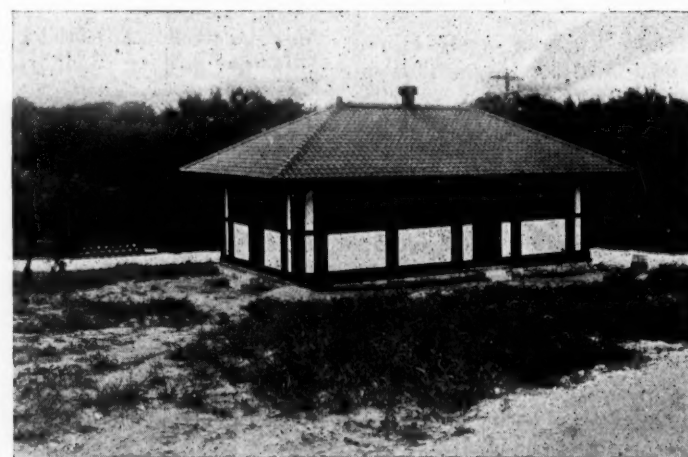
The second building (joined to the first) has a small grocery store, and quarters for the caretaker of the grounds—for a caretaker will be on hand at all hours, to serve visitors.

The third building is detached; it is the kitchen and laundry.

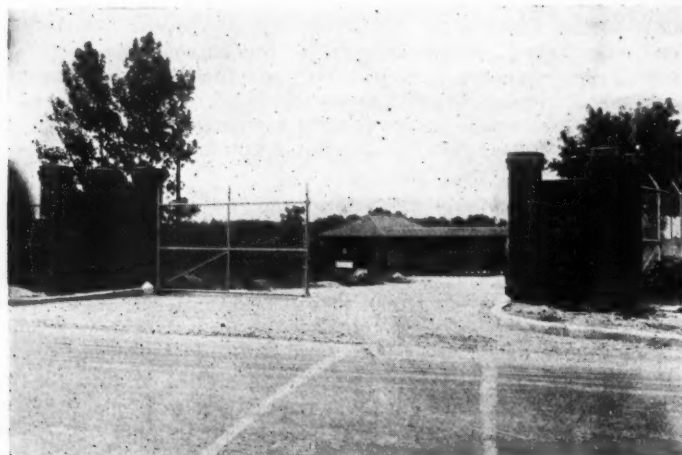
Campers here will live in luxury, for they will do their “housework” by electricity. There are electric washing machines and stationary tubs and other facilities of a laundry; electric stoves—six of them—and tables, sink, and similar kitchen equipment. Electricity is available through a “slot meter,” a nickle dropped into the slot providing electricity

for one of the stoves, or for the washing machine, for an hour.

Hydrants and hose for washing cars are also provided. The grounds and the houses are lighted at night, by the city.



The photo above shows the entrance to the grocery store of the Kansas City free camping park for motorists; below is the electrically lighted and operated laundry and kitchen. These buildings were designed to meet the needs of the traveling driver and are among the leaders in this field. To the left is the entrance to the park. Among other things, hydrants and hose are supplied the motorist with which to wash the car after a long drive



### ROLLS-ROYCE EXPANDING

SPRINGFIELD, Mass., July 29—Rolls-Royce of America, Inc., is installing machinery in its branch factory for the manufacture of bodies, and will soon have this department in production. Owing to the necessity of making the

painting and upholstery departments scrupulously clean, new floors and side-walls have been built in the workrooms of the six-story section of the Knox Motors building, which was leased for the purpose. A force of about 100 will soon be at work there. At the main

plant eight chassis a week are being made, and an increase to 10 a week is contemplated when the coach department gets under way. It is stated that orders are now in hand sufficient to keep the factory running on full time through November.



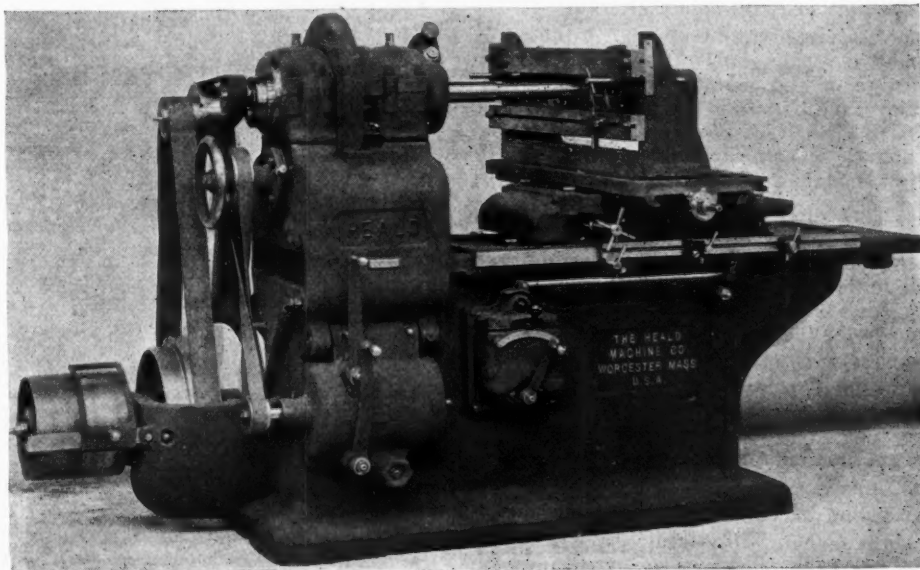
## New Equipment and Data for Maintenance

### New Model Heald Cylinder Grinder

A NEW model cylinder grinder, known as the Model No. 50, has been recently announced by the Heald Machine Co., of Worcester, Mass. The new machine retains the well known Heald features of construction in addition to which there are incorporated in this latest model several refinements indicative of an effort to secure greater rigidity and a smoother cylinder bore finish.

The main casting is a solid bed supporting both the eccentric working head and the work table; it is of exceptional width and heavier than the former models. The construction permits of a single pulley drive and the main driving shaft on the rear of the machine is mounted on ball bearings and takes the power directly from the main line without countershaft.

The main table is mounted on the usual dovetail ways provided with oil pockets and rolls. The drive for the main table shows a great divergence from former Heald practice and although old in principle, has not previously been incorporated in cylinder grinder construction. The mechanism consists of a simple hydraulic arrangement, using oil as the operative medium. With this drive the makers claim that the table can be reversed at any desired point without shock or noise. The absence of shock and consequent smooth movement of the table, according to the makers, attribute considerably to a finer cylinder wall finish. Gross adjustment is given to the cross slide table by the usual feed screw which has a range of action of 28 inches. The feed screw is fitted with a micrometer dial for fine adjustments while indication for large dimensions is supplied by adjustable dogs. Vertical adjustment of the cross slide table is secured by means of two inclined slides, the construction of which are shown below. The screw "R" is connected by gear to small hand wheel, movement of the screw "R" causes a corresponding movement of the upper inclined slide "P" in a direction parallel to the main table. In so doing the upper plate moves up and down on the inclined



Heald model No. 50 cylinder regrinder which incorporates a number of refinements

surface of "Q" raising or lowering the cross slide table and work through a range of 5-16 inch. When used as a regrinding machine on varied work, such as is encountered in the automobile repair shop, a universal jig is furnished which locates the hole for the grinding center. When work is of such dimensions that there is not sufficient distance between the grinding center of the eccentric and the top of the cross slide table, the cross slide table assembly as a complete unit can be removed, enabling the operator to set the work up directly on the main table. The connection "U," between the top inclined slide and the main table, retains the position of the grinding wheel relative to the work the same, regardless of any vertical adjustment.

A variety of spindle lengths are obtainable from the factory and the purchaser has option of any size from the 7½-inch to the combination 11 inches by 18 inches, which is desirable for the average automotive maintenance institution. This spindle arm grinds holes 2¾ inches in diameter and larger, by 11 inches long, also holes 3 inches and larger by 18 inches long. Condensed

general specifications of the machine are printed below:

Standard grinding wheels for the regular 11 inches by 18 inches spindle are 2¾ by 3¼ inches in diameter.

Speed of standard grinding wheels is 4950-4500 surface feet per minute.

Vertical adjustment 5-16 inch.

Traverse adjustment of cross slide 28 inches.

Cross slide table 43¾ inches long by 16¾ inches wide.

Finished top 38 inches long by 12¾ inches wide with two "T" slots.

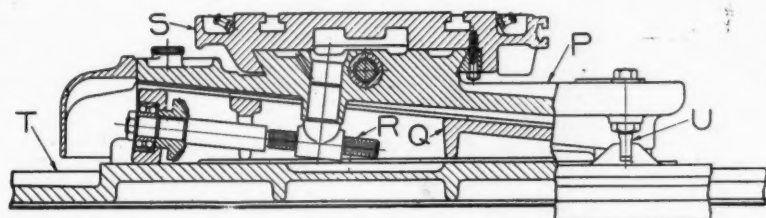
Greatest and least distance of finished pad on cross slide table below center of grinding circle 9 21-32 inches and 9 11-32 inches, respectively.

Floor space 73 inches by 123 inches. Tight and loose pulley 12 inches by 5 inches face. Speed 750 R. P. M.

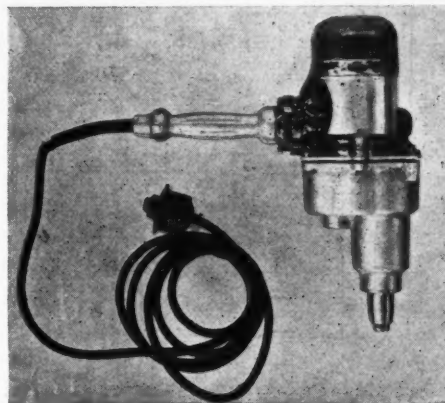
Weight of machine fully equipped with jig, 5,000 lbs.

Size of motor recommended — 5 H. P.—Speed 1000 to 1200 R. P. M.

Machine equipment includes: Wheel spindle, assorted grinding wheels, one mounted diamond and necessary wrenches.



Section showing inclined plane method of vertical table adjustment on new model Heald grinder





## Electric Machine for Setting Nuts and Screws

**A**N electrically driven machine for setting cap screws, nuts, studs, etc., has been developed, primarily for production use in factories, but which, nevertheless, can be applied to the automotive repair shop. Two portable sizes are made and one stationary, the former two handling nuts 1-8 to 5-16 inch and  $\frac{1}{8}$  to  $\frac{1}{2}$  inch, respectively, while the stationary machine will take sizes from  $\frac{1}{2}$  to 1 inch.

The tool is made by the Elecdrive Mfg. Co., Syracuse, N. Y., and resembles an electric drill in its general outline, but that the stationary type is a radical departure from any machine heretofore made for this purpose. The portable tool operates from an electric light socket on either a direct or an alternating current circuit of 110 volts, with a frequency not exceeding 60 in the case of alternating currents.

During the period the screw or nut is being driven down the driving spindle of the machine rotates at 1000 r.p.m., but during the actual setting of the nut or screw the spindle is slowed down to about 350 r.p.m. The driving mechanism, which forms the patented feature of the tool, consists of a multiple disk slip clutch, which can be adjusted for any torque within the capacity of the motor, driving through a splined shaft to a positive clutch. This positive clutch automatically "kicks out" when the disk clutch is fully released. While the positive clutch is disengaged the driving spindle is entirely free. This feature permits the removal of the wrench, chuck or screw driver from the driven member and its engagement with a new member while the motor is running at full speed.

It is claimed that the slip clutch insures that all nuts or screws are driven to the same tension and that it prevents shocks to the motor. This clutch is so designed that it cannot be overtightened, and thus cannot overload and burn out the motor.

## Small Size HB Constant Potential Charging Outfit

Hobart Brothers announce, in addition to their 400-ampere charging outfit, a smaller machine capable of delivering 200 amperes, which has the same general characteristics and advantages as the larger machine but is not designed to handle as many batteries at a time. By this method the average battery will start charging at 40 or 60 amperes, which current will automatically reduce as the battery voltage rises. In this way the battery gets approximately three-fourths of its charge in the first three hours, as will be seen by referring to the curves shown in Fig. 2. Fig. 1 gives the general appearance of the charging outfit.

A constant voltage of 7.5 is maintained regardless of the number of batteries on the line, or current drawn from the machine, this condition being obtained by a small amount of compound winding and by special construction.

A hand-operated rheostat is also provided to compensate for change in temperature of the windings, as heat tends to slightly reduce the output of any machine. Hobart Brothers advise that with batteries in good condition, that is discharged but not badly sulphated, that no attention is needed, but that sulphated batteries should be watched for temperature rise and if found to be overheating they should have a slight resistance put in series with that battery only, to slightly reduce the current drawn.

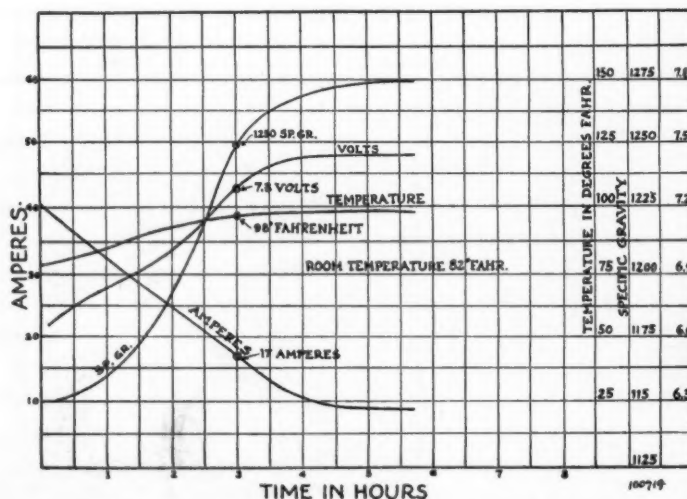
It is our opinion that even this would hardly be necessary as a sulphated battery usually has a higher resistance than a good battery, and reduces the current, due to this resistance instead of by its own back E. M. F. or voltage. However, it does no harm to be careful, and it would be well for the battery man to check the temperature of batteries on charge when first using an outfit of this kind until he becomes

thoroughly familiar with the way it performs with batteries in various conditions.

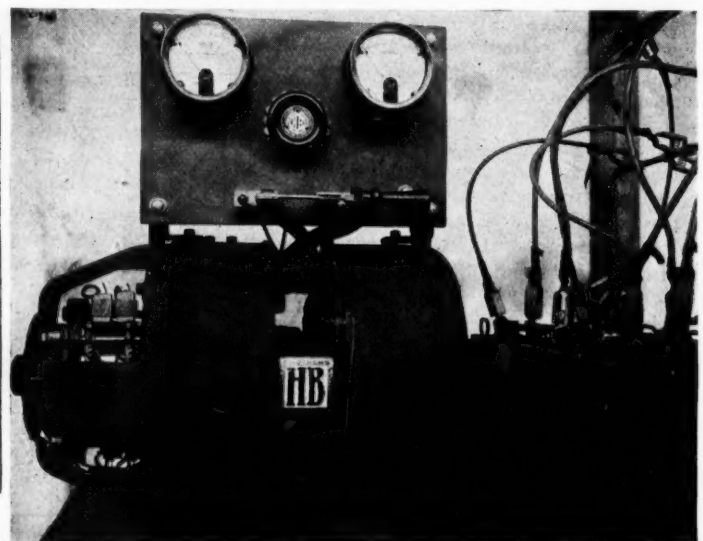
This 200-ampere machine is designed for 6-volt batteries only, as these are most commonly encountered. However, it is possible to handle 12-volt batteries by charging first one-half of the battery and then the other half. The outfit is of single unit construction, ball bearing mounted and includes the switchboard with rheostat and meters, also bus bars and connecting cables. It is sold for practically \$85.00 cash, together with 10 monthly payments of \$30.00 each. Additional information can be had from the makers, Hobart Bros., Troy, Ohio.

## Piston Pin Data Booklet

**A** 20-page booklet has been compiled by the King Sewing Machine Co., of Buffalo, N. Y., which has recently engaged in the manufacture of piston pins for internal combustion engines. Although the booklet is intended primarily as a catalog its contents are of such a nature as to qualify it for use as a piston pin data book. The first page is given over to a key list of the code words used in describing the various types of pins used in the engines of the several makes of cars, and trucks. Several pages are devoted to pin specifications of American stock engines and a very comprehensive list of engines equipped with piston pins which are interchangeable with the pins used in other engines. The last named list should prove of value to the cylinder regrinding shop in particular and to the institution engaged in general automotive maintenance. Standard sizes and the recognized oversizes of pins are listed. Semi-finished pins are manufactured for sale to regrinding firms and the book also lists the prices of the pins specified. The booklet is sent post free upon application to the above named firm.



Curves showing how a 100 ampere hour battery is charged by the HB constant potential method



HB 200 ampere constant potential battery charging outfit

# ENGINEERING DEVELOPMENTS THAT MARK THE TREND OF THOUGHT

*A Review of Some Practices and Theories Reported at the Summer Meeting of the Society of Automotive Engineers and Gleaned From Recent Publications*

By B. M. IKERT

THE summer meeting of the Society of Automotive Engineers always brings about a peak of development thought in engine and chassis design and fuel economy. In the belief that the automotive dealer, as well as the man who sells automotive maintenance, is interested in what is going on in the laboratories and testing grounds of the makers, we present some of the more important developments. Some of the text matter is taken as it appeared in "Automotive Industries."

## Maintenance Interwoven with Design

There is much to indicate that maintenance has been given thought by designers and engineers. This has been done directly or indirectly. If a unit has been developed with a thought to better accessibility, certainly it helps the maintenance man. Again, if fuel handling has been improved to give better engine performance with low grade fuel, then again the maintenance man's problem becomes less complicated. If chassis units are designed to relieve strains and stresses on the drive members and provision is made for cushioning road shocks, certainly the maintenance requirements on such a vehicle become less. This year, more than ever, the thread of maintenance is woven throughout the tapestry of automotive engineering and developments.

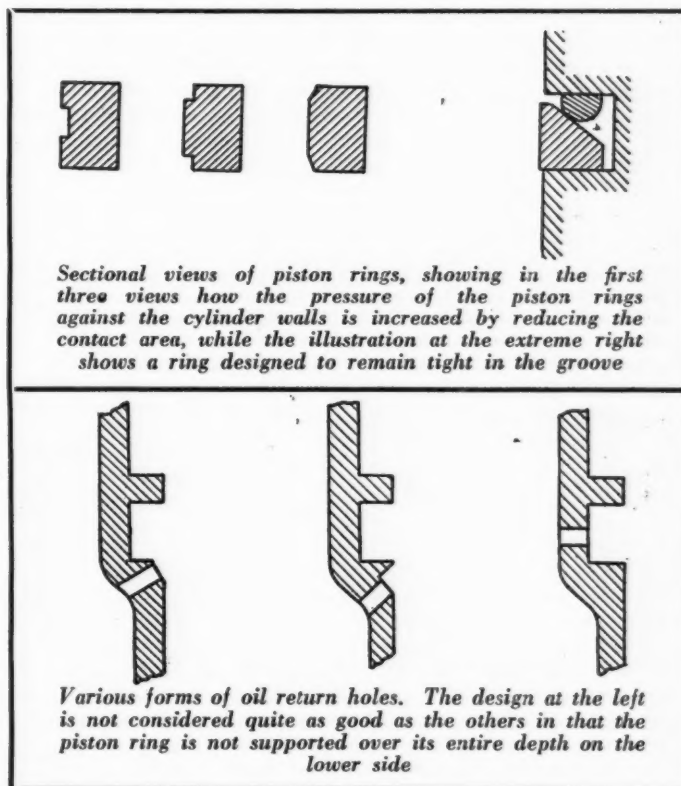
There has been considerable research directed at the solution of the fuel problem. The present day fuel presents problems in carburetion which were more or less unknown a few years ago when gasoline was more readily vaporized. In the early days hot spots were not necessary in converting the liquid fuel into a vapor, but in today's engines we find various means for practically cracking the fuel before it enters the combustion chamber. The present day fuel is also causing annoyance, especially with service men, in that it is inclined to cause knocking in high compression engines used today. Therefore, it is of interest to learn of the anti-knock substance which Thomas Midgley, Jr., of the General Motors research laboratory has produced.

## Anti-Knock Liquid

This substance is called ethyl lead, which can be added to gasoline and will thereby prevent detonation or knock, even with an engine of very high compression. This substance is made from materials which are available in practically unlimited quantities, and is the most effective of numerous anti-knock substances with which this laboratory has been experimenting for a number of years. It is made from alcohol and lead by a special process which has not been revealed. It is stated that one cubic centimeter of this liquid added to a gallon of the average commercial gasoline will prevent knock in an engine of the average compression. It is the plan of the General Motors Corp. to market this product through petroleum refiners, who will add it to gasoline before it is distributed.

## Oil Consumption Considered

One of the important subjects recently discussed by the engineers is that of oil consumption and oil pumping. It appears to be the opinion of quite a few that trouble from oil pumping and high oil consumption can be minimized by making certain that the cylinder bore is perfectly true and that the piston rings are well fitted. In a paper presented at the S. A. E. meeting, by George A. Round, of the Vacuum Oil Co., the



author referred to the influence of the ring pressure per unit of cylinder contact area on the oil consumption and said that by cutting down the bearing surface of the rings in an aircraft engine by one-third, the oil consumption was decreased about 30 per cent.

All of the three methods of reducing bearing surface of a ring shown in the accompanying illustration are equally effective in this respect. Naturally, if the bearing surface is reduced very much, the unit pressure is much greater and squeezes out the oil, which naturally results in rapid wear. The author thinks that a reasonable working limit is two pounds per square inch of diameter to close a one-quarter inch ring. Much oil pumping has been traced to defective rings that bear only part way on the cylinder walls. The original cause may either be poor inspection, or distortion in assembling them on the pistons. Regarding oil pumping there seems to be no difference between narrow and wide rings as long as the unit pressure remains the same. However, the narrower rings wear the piston grooves less and are therefore preferable, specially in connection with aluminum pistons. Oil grooves with return holes are a great help in keeping down the oil consumption.

## Types of Piston Rings

Three forms of oil return holes are shown herewith. The one on the left has been used a great deal, but does not possess the advantage of that shown in the center, in which it will be noted that the ring is supported over its whole depth on the lower side and will, therefore, not wear loose in its groove so rapidly. The ring illustrated at the right has been found



effective in some engines. In V-type engines the oil grooves should extend half way around the piston and be on the lower side. As to the size of oil holes,  $5/32$  in. or  $1/8$  in., spaced  $1\frac{1}{2}$  inches apart, are recommended. The new type of constant clearance aluminum piston, such as used in the Essex, Maxwell, Hudson and a few other cars, does not require oil return holes.

So long as we have heavy fuel or fuel which is difficult to vaporize we shall have more or less difficulty with dilution of oil. The subject of oil dilution is one that has taken the attention of engineers to considerable extent. Recently a device known as the Skinner device for neutralizing the effect of oil pumping and oil dilution by fuel has been produced.

#### The Skinner Device

This device becomes a part of the power plant and a diagram of its construction is presented on these pages. A connection (A) is made to the cylinder wall at a point which coincides with the lower limit of the travel of a groove, located on the piston below the ring just above the piston pin. A short vertical groove intersecting the circumferential groove and in line with the hole is also cut in the piston. The connection (A) leads to a heater (C) that is connected to the exhaust manifold by the pipe (D) and thence to the separator (E).

From the upper part of this device a connection (F) is made to the intake manifold (G). The lower part of the separator is cut off from the upper by a valve and communicates with the crankcase. On the side of the piston opposite the connection a hole is drilled through the groove into the inside of the piston.

In the operation of the device the suction in the manifold is communicated to the groove in the piston while the latter is near the bottom of its travel and during approximately 90 deg. of crank motion. The vacuum created draws into the heater any oil or oil and fuel mixture that collects in the groove, and with it a small amount of air. In passing through the heater, the mixture is heated by the exhaust to a temperature of about 375 deg. Fahr. On reaching the separator, any fuel or water present in the oil is evaporated and carried into the manifold. The remaining oil is passed into the bottom of the separator, from which it flows back to the crankcase.

#### Experience of One Engineer

In speaking of factors that affect oil pumping, H. M. Crane stated he had found oil grooves and holes in the pistons useless. It was his practice with cast iron pistons to allow .001 in. clearance per inch of bore on the skirt or cross head portion and to place the piston pin about at the center of this portion. On top of this cross head was the ring zone providing for three rings, and at the bottom of it was the scraper ring, which overran the end of the bore.

The oil was trapped between the top and bottom rings, as shown by the fact that in an aircraft engine which had been in use for quite a while this portion of the piston wall was often quite black, showing that there had been no metallic contact. He claimed that the ordinary concentric ring performed every desirable function. Where the scraper ring at the bottom of the piston overruns the bore, the oil is trapped between the upper and lower rings and piston slap is thereby prevented. It is important, of course, to have the sides of the ring parallel to the bore of the cylinder and to have the cylinder true in order to give the rings an opportunity to function correctly.

In speaking of piston rings it is well to note that in the minds of many engineers the plain slot ring is as good as any, provided the rings are well fitted to the piston and cylinder.

#### The Overhead Camshaft

The overhead camshaft engine came in for considerable dis-

cussion following the paper presented by P. M. Heldt, engineering editor, "Automotive Industries," at the summer meeting of the S. A. E. During the discussion, F. E. Moskovics, of Nordyke & Marmon Co., stated that the chief difficulty in connection with the direct actuation of the valves from the overhead camshaft was not due to the necessity for clearance adjustment but to the side thrust on the valve stems. It was admitted that the overhead camshaft engine had certain advantages, but the service problem is a factor which must not be overlooked. In service the cylinders will become carbonized and the heads then have to be removed for scraping out the carbon, and if the camshaft was on top of the engine this is necessarily harder to do. It was also stated that the problem to keep an overhead camshaft engine silent was more difficult, as a cylinder head seems to be a natural sounding board, whereas the crankcase acts as a muffler.

Jesse G. Vincent, of the Packard Co., stated that he had gone through with the development of L-head, valve-in-head and camshaft engines and in his estimation the lack of accessibility was the chief objection to the overhead camshaft engine. He thought that for passenger car service the choice lay between the L-head and the valve-in-head engine. He had never been able to observe the difference of more than one per cent in engine efficiency by placing the valves in the head, and said much greater gains were possible by equal efforts in other directions, as, for instance, in connection with the carburetor system.

#### Duesenberg on Overhead Camshaft

Fred Duesenberg, who has spent considerable time in developing overhead camshaft engines, said that with his type of construction there was no chance of disturbing the timing in removing the cylinder head, as the drive was through a single jaw clutch, which could not be inserted wrong. The accessibility he considered even better with the overhead camshaft engine than with other types, because the sides of the crankcase were left free. As an illustration of the ease of removing and replacing a cylinder head, he mentioned that in a California race Jimmy Murphy burned out one of the valves in the first lap and he and his mechanic removed the cylinder head, replaced the valve and then put the cylinder head back on in just 32 minutes, after which he established a world's record. One of the engineers present remarked that he saw the two men at work and he felt that they did just about as much work in the 32 minutes as the average repair shop crew would do in 32 hours.

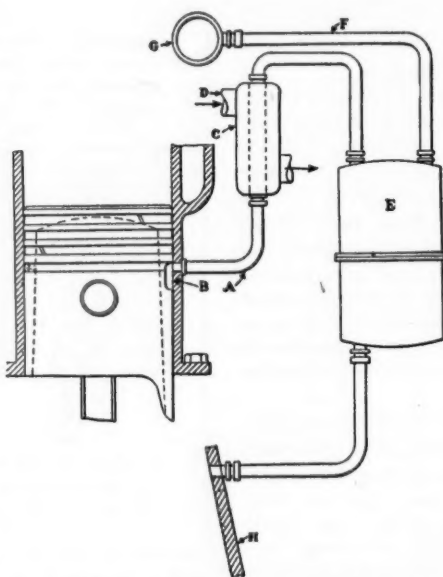
#### Spring Suspension

Spring suspension in the past has seen the majority of chassis models using the Hotchkiss drive, that is, the construction whereby the car propulsion is through the rear springs as well as the torque reaction of driving and braking. There is no question but what the Hotchkiss drive makes for simplicity in design. It is light in weight and has a minimum number of parts to wear and rattle. It affords a cushioned resistance to suddenly applied driving and braking loads, and has several other advantages. But it also has its disadvantages.

When the rear springs are flexible enough to give good riding qualities, the resistance to torque reaction, that is, the tendency of the axle housing to rotate, is too soft, especially in lighter cars, with the result that the rear axle tends to jump when under heavy driving or braking loads on a rough or soft road.

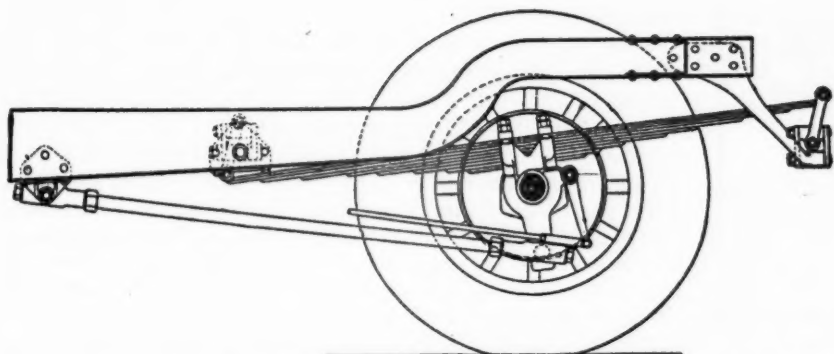
Engineers are giving the spring suspension considerable thought these days, and in connection with the Hotchkiss drive it is of interest to study the spring suspension developed by H. M. Crane. A sketch is printed herewith.

The sketch shows a semi-elliptic spring, shackled at both ends, and rigidly bolted to the axle. It shows also distance

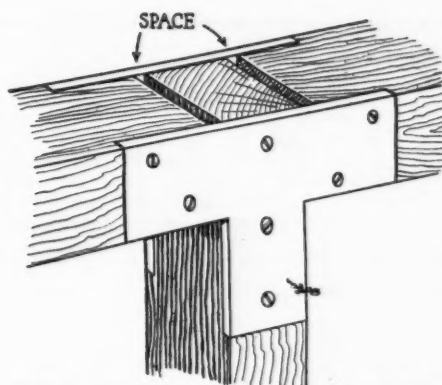


The Skinner device for neutralizing the effect of oil pumping and dilution of the oil by the fuel





**Crane spring suspension, which is said to combine the simplicity of the Hotchkiss drive and overcomes two of its principal disadvantages**



**Body frame joint construction fashioned after the practice of airplane fuselage. It is a European idea and said to be of benefit in overcoming squeaks**

rod, the forward end of which is connected to the frame by a ball-and-socket joint and the rear end is connected to the axle by a similar joint, not at the center line of the axle, but at a point substantially below the center line, a bracket rigidly attached to the axle being provided for the purpose.

It is obvious that with this arrangement the axle is free to move longitudinally with respect to the frame as well as vertically, while at the same time it is constrained in both these movements by the resistance of the semi-elliptic spring. The vertical resistance need not be explained, being the normal spring action. The resistance to longitudinal movement is occasioned by the fact that, to translate longitudinally, the axle casing must rotate about the ball-and-socket joint located below the center of the axle. This rotation is resisted by a couple set up in the spring, tending to increase the load on one arm of the spring and decrease it on the other. The character of resistance evidently can be varied by changing the distance of the point of attachment of the distance rod below the center of the axle. The spring shackles are made long enough not to interfere with this action. It is also necessary to provide for extra longitudinal come-and-go in the propeller shaft connection.

As in the conventional Hotchkiss drive, the torque reaction due to driving and braking are resisted by couples set up in the springs, but in this case the couples are of considerably less magnitude, due to the action of the lever arms to which the distance rods are attached. The reduced twisting of the axle is very evident in actual driving, as is also the improved action over soft rough roads when using heavy power. The latter improvement undoubtedly is caused by the better method of taking care of the torque reactions and by a different type of tire reaction with this suspension.

The new method of suspension is believed to provide a considerable improvement over conventional arrangements by reducing materially the maximum compression in the tire under any given set of operating conditions, and by giving an attachment between the axle and the frame that is cushioned in all directions except laterally.

The aforementioned developments are those which were discussed chiefly at the recent S. A. E. summer meeting. There are, however, other developments which have been going on for some time, both in this country and abroad, and which those who are connected with the automotive industry in its many phases ought to know about.

### More Front End Devices

Take the matter of front-end drives in engines. About a year ago we had, out of 125 chassis models, 81 per cent using helical gears, 16 per cent chain drive, 2 per cent spur gears and one per cent other drives. Today the percentage of chain drives has gone to 24 per cent.

Probably the most potent factor in the chain having become so popular is in the manufacturing methods of making the chain, which has resulted in a better product at a less cost. Its range of adaptability is shown by the fact that it is used

in the Lincoln and also in the Star, the latter to sell around the \$350 mark.

From the maintenance standpoint the chain leaves little to be desired, as adjustment in most cases can be done by simple means located on the outside of the case. No matter how well the chain is designed or how good a layout is used, the full benefit of chain silence is not obtained if some means for taking up the normal stretch is not provided. The chain adjustment must be accessible and of sufficient range to allow of an adjustment of one full link plus 10 per cent.

Considerable interest has developed in the use of the automatic spring chain tension idler which is designed to maintain the proper tension in the chain at all times without any attention on the part of the operator. The advantage claimed for the automatic adjustment is, of course, that the chain is continually running at the proper tension and, consequently, the silent drive operates without noise.

It must be realized that the high stresses in chain drive are momentary, due to sudden acceleration and deceleration of the engine. For this reason, the stresses in the chain run far higher than what would be calculated as required for merely driving the units involved. The stresses are of a shock nature, and, consequently, large factors of safety must be employed. The art, however, has developed rapidly during the past few years and the reliability of this type of drive has been fully established. Furthermore, other parts of the engine have been quieted to such an extent that the minor timing gear noises, which at one time were lost in the noises of greater volume, have now become prominent enough to cause the close scrutiny which is being given to the front-end drive.

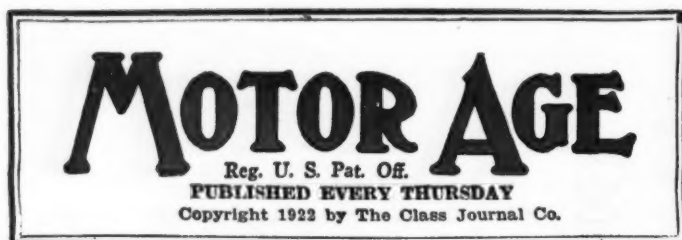
### Frame Strength and Body Strains

Body squeaks have been a source of trouble to the service man for many years and are one of the difficult things to overcome. Many have it that the frames used today are not stiff enough, with the result that the weave set up by severe road conditions affects the body to a considerable extent. Body builders complain they cannot build a body to suit a frame which will not "stay out."

Europe lately has produced a body construction that seems to have some possibilities. The thought is that a chassis is not and cannot be made absolutely rigid, and therefore to attempt to mount a rigid body on a flexible foundation is not a good procedure. No matter how strong the body may be, it must weave with the chassis and this in turn sets up noise and wear.

In this European construction the seats are mounted directly on the frame of the chassis, independently of the rest of the body. As seats are not very high, they are not influenced by twisting or weaving of the frame. Another advantage is that the seats placed this way reduces the overall height of the body and thus reduces the weigh also.

The body is built around the seats, but in no way attached to them. All the frame members are straight and of square section. There are no glued or dovetailed joints, the assembly of the body members being by light metal angle irons or plates of the type used in airplane fuselage. Sufficient play, nearly  $\frac{1}{4}$  in., is left between the frame members to avoid contact.



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## THE CLASS JOURNAL COMPANY

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## Where Do the Profits Come From?

A SALESMAN for a firm making electrical service station equipment was talking to a shop owner, trying to show him the value of time saving equipment. "What's the use," said the shop man, "of spending a lot of money for equipment when we can only get \$1.50 an hour for our work anyway. We would just do the job quicker and lose money two ways, because the people around here would never stand for a raise in rates. We have a hard enough time now getting anything out of this bunch of tightwads."

The salesman then presented this problem. Suppose each man in the shop puts in eight hours a day, doing two four hour jobs, and the shop collects for the labor at \$1.50 an hour or a total of \$12. If the man gets 75 cents an hour, the difference is \$6, which must cover overhead items and profit. On the other hand, if on each job an average of \$5 worth of parts would be used there would be a profit of say 40 per cent or, an additional profit due to parts used that would amount to \$4 per day per man, so that where the shop might be merely breaking even on the labor only, the fact that parts were sold on each job would make a profit possible.

Now suppose that labor and time saving equipment

is installed so that each job is cut in half. Further assume that no extra charge per hour is made. This will apparently result in a reduction of \$3 in the cost to the customer, who will naturally tell his friends about the quick service and reasonable charges.

This is not the whole story however, and the benefit is not limited to the customer only, for each workman formerly capable of turning out two jobs per day will now turn out four, and while the profit per day on labor will be the same, the increase in profit due to parts sold with each job will be doubled, so that for each shop man there will be an apparent profit of \$6 from labor and \$8 from sale of parts, instead of the former figure of \$6 from labor and \$4 from the sale of parts.

On this basis the earnings of one man would justify the purchase of equipment that would require payments of \$100 a month, which is much in excess of the requirements of most equipment used in the electrical service station. We have of course figured that the time for each job would be cut in half, which reduction might not always take place, but on the other hand we have figured the profits from one workman only while in a large shop this increased profit would be multiplied many times. The customer getting the work done for \$8 which formerly cost him \$11, will also prove an asset, and the business will grow in proportion to the up to date equipment and methods employed.

PUZZLE—Where do the profits come from?

ANSWER—From careful investment in time saving equipment, which makes it possible to turn out more jobs, and thereby sell more parts, in which is the real profit.



"You Can Replace Anything Except the Good Will of Your Customers" is a timely reminder appearing in recent advertising.



The automotive merchant should be present at each meeting in his community where traffic, parking and safety rules are being discussed. These improvements seriously and directly affect his business.



## Where Does Maintenance Begin?

RECENTLY a manufacturer about to place a new car on the market was asked what he had done in the way of providing maintenance facilities for the vehicle about to be manufactured. The reply was that nothing tangible had been done, inasmuch as the maintenance problem was not acute until sufficient vehicles had been manufactured to warrant the subject being given serious thought.

Further questioning showed that even the design had not been seriously considered with the thought of incorporating into it accessibility and other structural features that have a direct appeal to dealer, maintenance men and car owner. This manufacturer probably was under the impression that selling maintenance on the car was a question of the dealer only. Let the dealer work out his own salvation so far as keeping the customers satisfied with the cars they had bought and which they expected to give good service.

True, maintenance is largely a dealer's proposition, but why not make matters as easy as possible by incorporating features in a car, truck or tractor design that will assure a dealer's ability to work out a maintenance program to the satisfaction of all concerned? It is easier to change a drawing than to scrap thousands of dollars worth of jigs and fixtures in the factory, to say nothing of having to overcome a lot of sales resistance



which has built up around a vehicle because the maker did not build maintenance into it in the original design.

It is within the rights of every dealer, before he takes over the agency for a car, to learn from the manufacturer of that car just what sort of maintenance program has been mapped out. He may have the best of intentions to keep his customers sold on the cars they have bought on his recommendations, but his efforts will fail if his hands are tied by a factory which has failed to provide maintenance facilities. The dealer must know the factory attitude before he can properly organize for maintenance, and maintenance is necessary for repeat sales.



*The merchant who is sold on his own goods has the sale half made.*



*If you pay your salesmen on a commission basis, why discharge them when business shows signs of slackening?*



### Fearlessness an Asset

SOME automotive dealers are inclined to try to stop discussions of more strict traffic control and to make every endeavor to get their owners out of trouble when they are served with a summons. These dealers have a mistaken idea that the promotion of the automobile depends upon an undue license and that if the dealer should help to check this undue license, that he will become unpopular with car owners.

This attitude is undoubtedly wrong. The greater majority of people generally are fair in their attitude towards laws and the great public. Most people do not want to work a hardship on their fellow man, and this includes car owners. A great many dealers are following this idea and are working for the benefit of their many reasonable customers, rather than for the wishes of the few unreasonable owners. Indeed, some dealers are noting certain persons as undesirable customers. These people are the ones who persist in getting into trouble with their cars. These dealers are wise enough to discriminate between good and bad publicity.

In the class of those dealers who see first the duty to their fellow man and to their great multitude of reasonable owners comes Philip H. Brockman, of St. Louis. Brockman is an automotive dealer and he is also a citizen who is willing to do his duty. He is President of the Board of Police Commissioners in that city and is leading a safety campaign there. In a two-column article printed in a St. Louis newspaper, Brockman defends the traffic squad of the police department against the lawbreaking driver and asks the aid of the law-observing people.

It is good to see a dealer who is fearless in his duty.



*If you knock the other man's goods, the customer is likely to think you are on the defensive.*



*Advertising should be sales effort, not financial favors to friends.*



### A Tire Merchandising Thought

I N the present more or less unsatisfactory condition in the tire merchandising field the dealer in this important part of automotive equipment should look well to his future. Recently there have been announced a number of new lines that will bear watching.

Some of these new lines apparently have nothing to recommend them beyond price. Merchandising based solely on price can never have a sound future. In tires, especially, quality should be a very important factor in the sale.

Then, too, the merchandising policies of some companies are very ragged and the dealer has no assurance in buying a stock of a particular tire that he will not soon have as competition this same tire underpriced by another merchant in his community. The dealer who undertakes to sell any branded line of merchandise should assure himself that in building a trade on this article that he will have an even break with others in the future.

Service is a considerable factor in many tire sales and this point should be made more of a factor in the tire business than it is. It is rather bad business as a general thing for the automotive dealer to engage in a price war with a department store or other big mercantile establishment. The same is true as to meeting mail order tire merchants on prices. The automotive dealer should feature service in his tire sale appeal. The idea has become prevalent that tire service had to a large extent disappeared with lower prices for tires. Perhaps this is true in many cases, but there are enough instances of a continued, profitable operation of the tire service shop to show that this can be done if the proper energy and intelligence is put behind the merchandising of tire service. Of course prices of service must be adjusted somewhat to the tire values, but this can be done without taking all of the profit out of the business.

There are a sufficient number of ethical tire manufacturers to assure the tire dealer of a sufficient range of choice of his merchandise.



*The line of least resistance is often the most dangerous advance.*



*How long since you have looked over your mailing list to see if your announcements are going to persons actually dead?*



### Standards of Practice

A RECENT letter to MOTOR AGE from an ambitious youth who sells the oil and gasoline at a pump for a fairly large garage, says that he recently read in this magazine an article about the proper care of tools and the losses avoided by giving attention to this feature. He says that he spoke to his employer about this and the employer told him, "When I want that tool room changed, I will change it and until then you will have to get along as well as you can."

Only a few days ago a mechanic came into the Motor AGE office and asked if we happened to know of an opening for a good man, if not the addresses of some shops that appreciated good work. He had quit his last job because the employer would not permit him to fit piston pins in the proper way and he refused to be a party to just merely putting in piston pins and trusting to chance for results. He got a job.

These instances are not quoted with a view of discrediting maintenance dealers, as we know as well as you do that these men are in the minority. But the fact that there are men who refuse to let their men do good work, and who refuse to accept suggestions from employees, indicates that there is real need of a more uniform standard of practice.

# Priority Order Worries Manufacturers

## Ban on Steel Shipments Would Curtail Production

**Demand for Automobiles Continues  
and July Output Probably  
Will Exceed 200,000**

NEW YORK, Aug. 1—Production of passenger cars and trucks for July probably will approximate a little more than 200,000 or around 75 per cent of the record figures of 288,000 established in June. Output of some companies will be practically as large as it was last month, but others are falling somewhat behind.

The expected seasonal decline in retail sales has become apparent, but it has not been sharp and is considerably less than the average for the last few years. Unless the situation is seriously complicated by the mine and rail strikes, it is expected that business for the third quarter will approach 75 per cent of the second quarter. This would mean a somewhat larger output than in the third quarter of 1921 which was the best of that year.

Automotive manufacturers are not as much disturbed about their supplies of coal as they are about the effect on the steel industry of the railroad priority order of the Interstate Commerce Commission. They were forewarned of the miners' strike by their trade associations and laid in surplus supplies which are standing them in good stead. The priority order is something over which they have no control, however.

If steel mills which supply automotive manufacturers are compelled to close or curtail their production sharply because they are unable to get coal or cars, the effect upon automobile output naturally will be serious. Car and truck manufacturers have their inventories extraordinarily well balanced and they are well covered by commitments, but if steel is not forthcoming they cannot continue indefinitely to turn out motor vehicles in large volume.

No serious complaint has come from the Detroit district of inability to obtain cars in which to ship finished products, but even if there should be a car shortage it would cause no great concern. The automotive industry has learned how to deliver its products on their own wheels under their own power, although it involves some inconvenience. It delivered nearly 80,000 vehicles in this way in March, 1920, when rail congestion was most acute.

The most disturbing factor in the present situation, therefore, is not lack of demand but the possibility that supplies of steel may be shut off. If steel comes through, cars and trucks will go out. If there is a serious slump in production it will be the result of inability to obtain supplies of essential materials.

## SHARP OAKLAND REDUCTIONS

DETROIT, Aug. 1—Oakland Motor Car Co. has made reductions in prices on all models ranging from \$240 to \$100 effective today.

The 15,000 mile written guarantee on the engine will be continued. The price list follows:

	Old Price	New Price
Roadster .....	\$1,120	\$ 975
Phaeton .....	1,145	995
Sport Car .....	1,265	1,165
2-pass. Coupe .....	1,285	1,185
4-pass. Coupe .....	1,685	1,445
Sedan .....	1,785	1,545

## 30 Per Cent of This Dealer's Sales to Women.

HARTFORD, CONN., July 29.—In a list of recent deliveries of automobiles, published by the Hartford Buick Co., of East Hartford, it was noticeable that of a total of 46 purchasers, 14, or a little more than 30 per cent, were women. The list gave the name and address of each purchaser and the model of car.

## ANOTHER TRUCK REDUCTION

LIMA, O., July 30—A complete revision of prices has been announced by the Gramm-Bernstein Motor Truck Co., affecting the whole line of Gramm-Pioneer trucks with the exception of one model. The price changes are as follows:

Model	Capacity	Old Price	New Price
10	1-ton	\$1,365	\$1,245
15	1½	1,900	1,750
65	1½	2,500	2,250
20	2	2,925	2,475
30	3	3,275	3,300
40	4	3,995	3,850
50	5-6	4,895	4,450

The model 75-P, 3½-ton, remains unchanged at \$4,225.

## CHICAGO DEALERS HOLD OUTING

CHICAGO, July 28—The second annual field day outing and barbecue of the Chicago Automobile Trade Association, was held yesterday at Deer Grove, Ill., 30 miles from Chicago, and was largely attended by dealers and their employees. The affair was in charge of an entertainment committee composed of the following: Harry Branstetter, chairman; C. E. Gregory, Arthur Jones, O. G. Temme, H. N. Fowler, Elmer Rich, H. W. Cooper, M. J. Moriarty and John Quinlan.

## ACQUIRES ALL AMERICAN TRUCK

FREMONT, O., July 31—Announcement has been made by the Fremont Consolidated Motors Corp., of Fremont, of its acquisition of the All American Truck Co., formerly located at Chicago. The Fremont company already is in production on the All American trucks in addition to the Fremont passenger car.

## Chicago Dealers Put On Elaborate Summer Show

**American Steamer Has Its First  
Showing—Nearly All Makes  
Represented**

CHICAGO, Aug. 1—An elaborate automobile show which Chicago dealers and distributors are counting upon to greatly stimulate sales throughout this territory during the late summer and early fall is a part of Chicago's Pageant of Progress exposition at the Municipal Pier which opened Saturday and will continue until Aug. 14. The automobile show is under the direction of the Chicago Automobile Trade Association.

A car having its first showing at this exposition is the American Steamer, manufactured by the American Steam Truck Co., of Chicago, at its factory at 5008 Bloomingdale avenue. A chassis of this car with engine exposed is on display. The car is in production on the 5-passenger phaeton model, priced at \$1650.

Included in the Ford Motor Co.'s extensive exhibit is what is said to be the oldest Ford in existence, a roadster made in 1903. This car still runs. The company also shows a miniature model of its Detroit plant. The Lincoln exhibit is included with that of the Ford.

An industrial tractor exhibition similar to those which have been shown in other cities by the Ford company, occupies a large area near the entrance to the Municipal Pier.

Virtually all the well-known makes of cars are exhibited in one or more models. In many cases a phaeton and an enclosed car are shown side by side. Some cars are shown with the California type of enclosed top.

## BUFFALO DEALERS' PICNIC

BUFFALO, July 26—The Buffalo Automobile Dealers' Association held its annual outing and barbecue at Dold's Wheatfield farm yesterday. All automobile dealers of the city were there. Mayor Schwab and Gus Miller of the state license bureau also attended. In the afternoon there was a baseball game, fat men's races and thin men's races, followed in the evening by a campfire and clambake.

## ALLEN SERVICE CO. ORGANIZED

PHILADELPHIA, Aug. 1—Service and parts for Allen cars will be provided by the Allen Motor Service Co., 2200 Diamond street, Philadelphia. This company has been organized for this purpose by the Levene Motor Co., which purchased the Allen parts at the recent receiver's sale at Columbus, O.



## Industry Has Most Active Half Year in California

Six Months Ending June 30 Exceeded Corresponding Period of Last Year by 41 Per Cent

OAKLAND, Cal., July 31—The most active half-year of the history of automotive vehicle selling in California is the record established by the six months ending June 30, according to figures on sales of new passenger cars and trucks for that period collected by Motor Registration News, of this city. These figures indicate not only that the automotive industry had a prosperous half-year, but that the entire state enjoyed and is enjoying such extensive prosperity that automotive sales will continue good throughout the balance of the year.

This record shows that sales for the first six months of 1922 exceeded those of the same period of 1921 by 41 per cent for the entire state. From Jan. 1, 1922, to June 30, California motorists purchased 66,246 new automobiles, as compared with 46,725 bought for the same period in 1921. The size of these figures makes them worth consideration, not only by California distributors and dealers, but by manufacturers, and, furthermore, by manufacturers and distributors of parts and equipment, notably camping out and sports equipment, since a large part of these cars is being used in the mountains and along the seashore of the Golden State.

Southern California continues to buy more cars than northern California, with 36,486 cars sold in the eleven southern counties during the period under discussion, and 29,760 in the 47 northern counties. Gain for the southern section of the state was 51 per cent for the first half of 1922, over the first half of 1921, while the increase in the north was 30 per cent. Automobile sales in the north for the second quarter of 1922 show a gain of 21 per cent over that for the first quarter of 1922.

Truck sales from Jan. 1 to July 1 of this year shows that this branch of the industry fared as well, proportionately, as did the passenger car department. A total of 8,174 motor trucks were sold in California in that period this year. The increase in percentages is well illustrated by the comparative truck sales of June, 1922, and June, 1921. In the month just ended, 1,828 motor trucks were sold in this state, while in June, 1921, sales were only 1,010 trucks, the increase being approximately 80 per cent.

As in previous years, the sales are fairly evenly divided among virtually all American makes of cars, some of which, however, have shown gains as high as 300 per cent over their sales for the first half of 1921. In the high-priced field, one well-known car shows a bona-fide increase of 100 per cent over sales for the same six months of 1921. June

crowned the six months' period with a sales mark by far the highest ever set by the automotive industry in this state. Passenger car and truck sales combined for June, 1922, reached 16,008, compared with 15,932 for May, the preceding month, an increase of 74, or more than two cars per day, or nearly three cars for every working day, of June. The truck business for June fell slightly below the figures for May, but the passenger car sales of 13,988 in May, increased to 14,180 in June, a gain of 192, or approximately 15 per cent.

While few dealers will admit that they even hope July will surpass these June figures in northern California, the majority of them are certain, basing their opinions on sales so far this month, that this will be a record July in point of sales of both passenger cars and trucks, though it is probable that the July truck sales will not equal those of May.

## 1,148,788 Cars and Trucks Made in First Six Months

WASHINGTON, July 29—Figures compiled by the Department of Commerce from reports made there by approximately 90 passenger car manufacturers and 80 truck manufacturers show a total of 1,148,788 motor vehicles produced in the first six months of 1922. Trucks made in the first half year numbered 114,058, or almost exactly 10 per cent of the total.

June production totaled 287,875 of which 261,963 were passenger cars and 25,912 were trucks. Production figures by months follow:

1922	Passenger Cars	Trucks	Totals
January .....	81,693	9,344	91,037
February .....	109,170	13,121	122,291
March .....	152,959	19,651	172,610
April .....	197,221	22,227	219,448
May .....	231,724	23,803*	255,527
June .....	261,963	25,912	287,875
Grand Total	1,034,730	114,058	1,148,788

\*Revised.

## NEW SERIES COLE 890

INDIANAPOLIS, Aug. 1—Shipments are now being made of the new series Cole 890 which, while not radically different in design from former models, has many new chassis and equipment details with a new body, and the additions of equipment that hitherto have not been standard. An improved frame with larger springs and with a new "envelope" manifold and a new type carburetor are among the mechanical refinements. Six wheels are now standard, the extras being mounted on the side. The price of the new seven passenger car is \$2,685.

## ST. LOUIS DEALERS' PICNIC

ST. LOUIS, Mo., July 28—The second annual basket picnic of the St. Louis Automobile Dealers' Association was held last week at Lake Hill Park with an attendance of about 3,500. Athletic contests featured the picnic.

## Train Load of Dealers and Customers Goes for Cars

Caravan of 125 Hupmobiles to Be Driven from Factory to St. Louis District

ST. LOUIS, Aug. 29—A special train of 11 sleeping and dining cars, each bearing on the outside an electric illuminated sign, "Weber Hupmobile Special," left Thursday, July 27, at 4 P. M., from Union Station in St. Louis, carrying about 150 Hupmobile dealers and buyers from the St. Louis district to drive Hupmobiles back to St. Louis and the district.

The special was planned and arranged for by S. R. Jones, wholesale manager of the Weber Implement and Automobile Co., the Hupmobile distributor, who made a tour of the district enlisting the dealers in the enterprise and aiding them in signing up customers for the trip.

A noonday luncheon meeting on the second floor of the building of the Weber company at the northeast corner of Nineteenth and Locust streets took place before the special started and moving pictures of the train and its passengers were taken. A number of women were among the passengers and three "family coaches" were set apart for the use of them and the men accompanying them. These coaches were restricted to family parties. The other sleeping cars were known as "stag coaches."

A banquet will be given the visitors at the Hupmobile factory in Detroit. This will be followed by a tour of inspection of the factory under expert guidance.

Some of the dealers who will make the trip have mobilized parties of buyers, the largest number escorted by any one dealer being seven. The driveaway will start so that the party returns to St. Louis Sunday evening, July 30, at the latest. The Illinois dealers will break away from the driveaway motor train to reach their towns and the Missouri dealers will pass through St. Louis, making a formal entry.

The Weber company assigned three expert automobile mechanics to accompany the driveaway to help new Hupmobile owners in breaking in the cars properly. The road back to St. Louis will be through Toledo and Indianapolis, which offers a route of good roads, mostly concrete. Sixty Hupmobiles are expected to be in the train when it enters St. Louis. The total number of Hupmobiles to be driven from the factory is stated at 125 by Jones.

## CALIFORNIA TRADE TO MEET

OAKLAND, Cal., July 31—The California Automobile Trade Association will hold its annual general convention at Santa Barbara, about 100 miles south of here, in October, date to be announced later.

## New Automobile Plants Building Near San Francisco

**Among New Factories Planned Are  
Those of Chevrolet, Durant  
and Associated Motors**

SAN FRANCISCO, Cal., July 31—The automotive manufacturing and assembling industry is more active in the cities around San Francisco Bay than it has been at any time within the past five years. The Chevrolet Motor Co. of California has applied to the city council of Oakland for permission to close certain streets in order to provide more ground on which to erect extensive additions to its assembly plant, already the largest of its kind on the Pacific coast.

The plan of the company as revealed to the council is for an expansion to twice the size of the present plant, with an expenditure of approximately \$100,000 for buildings alone. The new unit will be used almost exclusively for construction of bodies for enclosed cars, to obviate the present shipment of these bodies from the factories in Cleveland and Detroit. The Chevrolet Company of California has its plant at Sixty-ninth Avenue and Foothill Boulevard, Oakland, and also owns considerable adjacent unoccupied land. The closing of two streets is asked in order that this land may be brought into the same parcel as that now occupied by the assembly plant. It is understood that official permission for the closing of the streets will be granted, there being no opposition, and that construction of the new unit will commence immediately.

Announcement also is made that the

Associated Motor Industries, of which W. I. Ohmer, of Dayton, Ohio, is chairman of the board of directors, will establish one of five assembling plants for automobiles and motor trucks at Oakland. Selection of the Oakland site for the assembly plant has not yet been announced.

The plant of the Durant Motors Co., at Oakland, construction work on which was started last November, and which has cost to date approximately \$1,000,000, is ready to start production of cars, according to announcement by George R. Scott, factory manager, on July 24. Associated with Scott in the program of construction was L. R. Holm, resident engineer for the company. The factory is located on an 18-acre site at East Fourteenth Street and Stanley Road, Oakland, and is connected by three spur tracks with the main line of the Southern Pacific Railroad, with the spurs so placed that 20 cars can be loaded or unloaded simultaneously. There is a floor space of 300,000 square feet in the factory, and an equal amount of space can be added without interfering with active operation of the factory, if, at any time, this addition becomes necessary.

R. C. Durant, president of the company, will maintain headquarters in the administration building, as will also Manager Scott, C. M. Steves, sales manager, and A. L. Warmington, comptroller.

The Indiana-Pacific Motor Truck Co. will erect an assembling plant in San Francisco this year, according to C. M. Menzies, of this city, who has charge of all territory west of Denver for that corporation, and who has just returned from a trip to the eastern headquarters of the company. Site of the new plant has not been announced.

## Top Notch Racers to Compete Again at Cotati Bowl Aug. 6

**Murphy and Milton Are Chief  
Contenders for Honor in  
150-Mile Event**

SAN FRANCISCO, Cal., July 31—The next big speedway contest will be at 150 miles in the Cotati Bowl, Aug. 6. The track has been put in the best of condition, better facilities for pedestrian traffic into and out of the grandstand have been provided, and ferry service increased, so that there is every prospect of the largest crowd yet seen at any of the automobile races on the coast this season.

The big contest in this race is between Jimmie Murphy, who has annexed everything worth while in the racing game this year, and Tommy Milton, who likewise cleaned up in 1921. Other entries are: Al Melcher, Jerry Wonderlich, Harry Hartz, Roscoe Searles, Frank Elliott, Ralph de Palma, Peter de Paola, Joe Thomas and Eddie Hearne. There probably will be other entries between now and the day of the race, but the 11 above listed are enough to make a thriller even if no one else comes in.

The standing of the racing drivers, as given out by the A. A. Contest Board in the 1922 championships, is as follows:

Murphy .....	2850
Hartz .....	1225
Milton .....	940
Elliott .....	375
Hearne .....	320
Searles .....	280
Wonderlich .....	254
Bordino .....	195
Klein .....	162
Mulford .....	160
De Palma .....	155
Haibe .....	109
Thomas .....	99
Fetterman .....	88
Wilcox .....	50
Alley .....	35
De Paola .....	28
Miller .....	25
Vail .....	21
Koetzla .....	19
Shafer .....	17
Morton .....	15

### SUPPLY COMPANY BANKRUPT

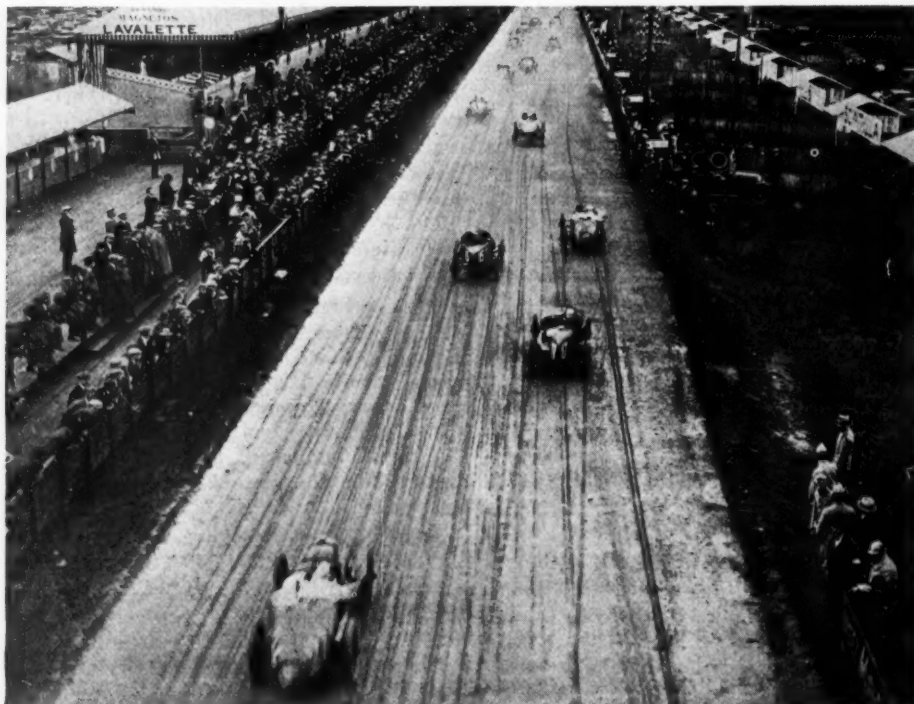
OMAHA, Neb., July 26—Involuntary bankruptcy proceedings against the Powell Supply Co., dealers in accessories and supplies, 2051 Farnam street, were filed in federal court here. The firm's liabilities are reported to be \$185,000.

Petitioning creditors are the United States Rubber Co., \$1,126; Federal Rubber Co., \$638, and the Foster-Barker Insurance Co., \$2,076.

### ACCESSORY MEN MEET OCT. 16

PHILADELPHIA, Aug. 1—The Automobile Accessories branch of the National Hardware Association will hold an exhibition from Oct. 16 to 20 at the Ambassador Hotel, Atlantic City, in connection with the twenty-eighth annual convention of the National Hardware Association.

## View of Recent Grand Prix Race in France





## Road Demonstration "Sells" Salesmen on Their Own Car

### New York Distributor Arranges Novel Test to Increase Enthusi- asm of Employees

NEW YORK, Aug. 1—A severe road demonstration of the car they were selling was arranged recently for salesmen of the Marmon Automobile Co. of New York with the idea of making them realize more definitely the quality and dependability of the product they have so many times demonstrated to customers.

The idea of this demonstration originated with S. S. Toback, vice-president of the Marmon Automobile Co. of New York, and was carried out by E. S. Partridge, general sales director. It was the opinion of Toback that the sales organization should be more thoroughly "sold" on their own goods and for this purpose he arranged the road test. A trip through the Ramapo mountains and Sullivan County, in the foothills of the Catskills, was decided upon.

The party, consisting of the sales and service forces of the New York agency, and the sales forces of the Brooklyn, New Rochelle, White Plains, Greenwich, Newark, Paterson and Perth Amboy agencies, left New York in a fleet of nine cars on Saturday and passed through Englewood, Hackensack, Arcola and thence around narrow turns and winding roads through Suffern, Tuxedo, Goshen, Middleton, Monticello and Liberty to Roscoe, which is 1,350 feet above sea level. From there it was a climb of 1,400 feet in three miles to Lakewood Farm Inn on the shore of Lake Florence. Here the cars were tested for speed, ease of control and hill climbing on rough and difficult roads.

The return to New York was made late Sunday evening. Among those who took part in the run were:

C. J. Cook, H. M. Stillman, Tom White, Joseph Caggiano, Charles Steuerwald, Stanley Beck, W. F. Robertson, H. E. Clark, J. A. Smith, C. V. Hall, H. P. Flugge, W. A. Sheldon, H. T. Birnie, all of New York organization; A. J. Grabie, G. M. Bishop, of Brooklyn; N. N. Callenberg and George B. Banks, of New Rochelle; A. L. Core, of White Plains; H. W. Brown and S. B. Grant, of Newark; R. F. Marsden and William J. O'Neill, of Greenwich; P. C. Marchese, of Paterson; Charles Weed and Nathan Lazineck.

### FARMERS BUYING MACHINERY

DAVENPORT, Iowa, July 22.—The Iowa farmer is buying nearly as much machinery now as he did before the war, and far more than at any time since the close of the war, according to implement dealers, who report that cash sales are almost universal—greater cash transactions even than were recorded in most prosperous war times.

International Harvester Co. distributors summarize the trade conditions by stating that the farmer is "buying what he needs, and buying it more intelligently by far than during the war period."

Emerson-Brantingham Implement Co. representatives claim a 500 per cent increase in business over last year, with prospect that the summer month reports will be even greater. Twin-City Machinery Co. reports "eight to ten times as much business as a year ago. Southeast Iowa, usually lagging behind the state in sales, has been our best territory. We are doing practically 100 per cent cash business, which is another thing that has surprised our force."

### WITHDRAWS FROM A. A. A.

COLUMBUS, O., July 31—Notices have been sent out by the Ohio Automobile Association that all members of automobile clubs in the state which are affiliated with the Ohio Automobile Association are also members of the newly organized National Motorists' Association.

At a meeting of the board of trustees of the Ohio State association a resolution was adopted withdrawing its membership from the American Automobile Association, the withdrawal to be effective immediately.

### STAR MOTORS INCORPORATED

WILMINGTON, Del., July 28—A charter has been issued to Star Motors, Inc., with a capital of \$100,000,000 which will be a holding company and an acceptance corporation for the various Star enterprises fathered by W. C. Durant. Star Motors will have branches in every state in the Union. The incorporators are W. C. Durant, C. P. Daly and Carroll Downes.

## Nash Sets Record with 1922 Sales Already Ahead of '21

KENOSHA, Wis., July 22.—Sales of Nash cars so far this year exceed the total passenger car sales of The Nash Motor Co. for the entire year of 1921. In the six months' period ending June 30, all previous records have been swept aside. The company's books, just closed for the first six months of 1922, show a volume of passenger car business far beyond that of the largest previous half year in the history of The Nash company.

Orders on hand for July shipment and reports from Nash dealers throughout the country indicate a continuance of the heavy demand throughout the summer months. The factory is still behind on orders, a condition which has prevailed since last March.

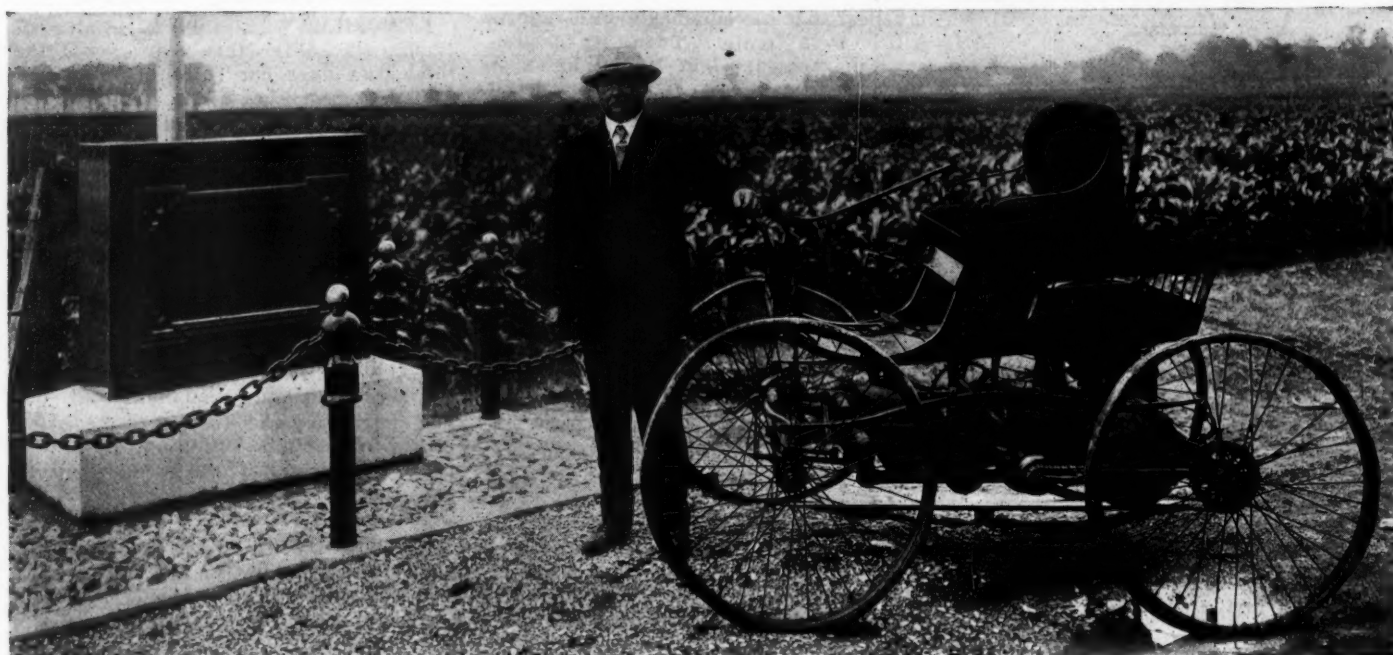
### GUM-DIPPED FIRESTONE CORD

AKRON, O., July 29—A new gum-dipped cord tire has been introduced by the Firestone Tire and Rubber Co. The process used is said to be an old one originally perfected by Firestone and only recently revived. It consists of dipping the fabric for tires in a special rubber gum to add strength and resiliency to the tire carcass. The new gum-dipped cord has been placed on the market at prices to compete with the standard cord tire grades of other major companies in sizes from 30x3½ up to 34x5. The 30x3½ non-skid casing is being advertised to the consumer for \$13.75.

## Dealer's Road Demonstration and Salesmen Who Were "Sold" by It



## The Man, the Car and the Monument



**T**HIS photograph made at Kokomo, Ind., July 4, shows Elwood Haynes standing beside the first automobile which he built in 1893. This car is now owned by the Smithsonian Institution at Washington, D. C., and was loaned to the Indiana Historical Commission to be used in connection with the dedication of

a monument at the point where Haynes made his first run in the car July 4, 1894. The monument, shown at the left of the picture, bears this inscription: "In commemoration of Elwood Haynes of Kokomo, Indiana, the inventor, designer, and builder of America's first mechanically successful automobile, in the year

eighteen hundred and ninety three. This tablet marks the road and starting place where Elwood Haynes on July 4, 1894, seated in America's first car, made the initial run. Here, too, was the birthplace of a new era of transportation; the nucleus and beginning of the now gigantic automobile industry. 1893-4."

### Six Months' Resume Shows Gains at Cleveland Plants

#### Production of Automobiles Far Ahead of That for Corresponding Period of Last Year

**CLEVELAND, Aug. 1**—Practically all the automobile companies in northern Ohio and particularly those in Cleveland have been liquidating bank debts, lowering inventories, and improving plants and properties and they have been supported by a six months' business that doubled the production records of the first six months of 1921.

It is too early yet to say just what July records will show, but there will be no such seasonal let-up as occurred in the same month a year ago. Here are some production facts from local factories for six months:

**The Cleveland Automobile Co.**—This company rode along at a much faster pace in the last six months than was anticipated and its volume was 300 per cent in excess of last year. The company is now making 65 cars a day and is behind orders. The gains that were made in May and June were maintained in July.

**The Peerless Motor Car Co.**—The first six months of 1922 brought a volume of sales that is 82 per cent of the entire

amount for last year. Production the first six months this year was 60 per cent in excess of the record for the corresponding period in 1921. Distributors were somewhat behind requirements and production is behind orders. Executives of the corporation cannot see a material falling off in business and they are planning greater production next year, which they expect to bring about by re-arrangements and changes in plant rather than by capital investment.

**Templar Motors Corp.**—This concern stands fourth today with a bright future. Its sales were 16 per cent in excess of the first six months in 1921. The company is banking heavily on an increased demand for cars in the fall. July production at this plant will exceed the records for May and June. Excellent dealer connections and good reports from them on what the Templar does in use has helped sales.

**Chandler Motor Car Co.**—This company's survey of general business outlook and requirements prophesies good business the last half of 1922 and some excellent business in 1923. The company shipped more automobiles in the first six months of 1922 than it did in 1921. There has been no let-up in July from the standard maintained in the second quarter.

**The Jordan Motor Co.**—The volume of sales this year is 40 per cent greater than it was for six months in 1921. The second quarter sales were 69 per cent

better than in the corresponding period last year. The company is making 1,000 cars a month, with closed cars and roadsters far behind.

**The Winton Co.**—The concern has been in the hands of a creditors' operating committee for some months and production has been 100 per cent better in the six months of the present year than it was in the same period last year. Prospects are improving from day to day.

**The F. B. Stearns Co.**—This company enjoyed a prosperous year in 1921, but the records of sales are 30 per cent better for the first six months of 1922. The company is making 300 cars a month, and the demand for the new six-cylinder models will run production up considerably from now on.

**Grant Motor Car Co.**—Despite readjustment activities, sales were about what they were in the first six months of last year.

**The Sterling Knight Syndicate.**—After a long period of development this company is now starting to produce. It expects to turn out 500 cars in the fiscal year ending May 1, 1923. Deliveries will begin in September.

**The Kurtz Motor Car Co.**—The company is now producing at the rate of 25 cars a month. Production for the year is 60 per cent better than a year ago. This company reports it is behind orders. It is busy building up a distributor organization.



## Nash to Move Lafayette Factory to Milwaukee

**New Plant Giving Greater Manufacturing Capacity to Be Ready Late This Year**

INDIANAPOLIS, Ind., July 28—The Lafayette Motors Corp., of Indianapolis, will transfer its operations to Milwaukee, Wis., the latter part of this year, according to an announcement by Charles W. Nash, president of the company, thereby benefiting by a closer association with the Nash group of industries of Kenosha and Milwaukee, of which it is financially a unit.

Land has been acquired adjacent to the Milwaukee Nash factory and work will start immediately on a model plant for the exclusive manufacture of Lafayette cars. Nash predicts that the company will be housed and operating in the new factory by the first of the year.

"The Lafayette has been greatly handicapped for space in its present plant at Mars Hill, Ind.," Nash said, "and this handicap will become much more serious as the company's production increases, thus making necessary an increased capacity either here or elsewhere. In view of these conditions and the desirability of a closer geographical coordination of all Nash activities, it seemed logical to the directors of our company to establish the Lafayette in a new plant in Milwaukee, even at the sacrifice of the many advantages which have been found in Indianapolis. The new Milwaukee plant will triple the present manufacturing capacity of the company. In its new location the Lafayette Motors Corp. will preserve its independent operating integrity and the management will remain the same. It is naturally the intention to retain the entire organization as thoroughly intact as possible. We are committed definitely to the policy of producing in the Lafayette a car of the highest quality, and the new plant has been laid out with the manufacturing requirements of such a car carefully in mind.

"The Lafayette business has now reached a point where we are able to determine an operating program with some accuracy. While the new plant will take care of all anticipated expansion for the next few years it will not be too large, with a consequent burden of expense. Every advantage developed up to date, both for manufacturing efficiency and accuracy of workmanship, essential to a car of this standard, will be provided. The location is near the main line of the Chicago and Northwestern Railway.

"Plans have been made to reduce to a minimum the interim between the operations in the present plant and the new one. The lapse in production should be very slight."

Production was started in the Indianapolis plant two and one-half years ago, almost simultaneously with the business

depression. During that period approximately 1,200 Lafayette cars have been delivered, and it is reported that lack of operating space has greatly limited the sales possibilities during period of greatest activities. Two months ago, following the dropping of negotiations toward a merger between the Lafayette and Pierce-Arrow companies, the Lafayette company was reorganized with \$2,000,000 additional working capital. Under this reorganization financial control of the Lafayette became vested in the Nash industries. It is rumored that tentative negotiations are already under way for the sale of the present Lafayette property at Mars Hill.

## Night School for Salesmen

ATLANTA, Ga., Aug. 1—The Atlanta branch of the Willys-Overland Co. is preparing to inaugurate a night school within the next few weeks for an intensive training course in automobile salesmanship. This sales training is to be given without cost or obligation to young men who pass certain tests, the school to be conducted at the company's branch here under capable instructors who are themselves automobile salesmen of some years' success. Those successfully completing the course are to be offered positions with the company's sales force.

## BUICK PRICES REDUCED

DETROIT, Aug. 3—The new price list of Buick cars, showing material reductions on most models, has been announced. The list follows:

	Old Price	New Price
6-cylinder, 118 in. w. b.—		
3-pass. roadster .....	\$1365	\$1175
Phaeton .....	1395	1195
Sedan .....	2165	1985
5-pass. touring sedan....		1935
6-cylinder, 124 in. w. b.—		
Sport roadster .....	\$1785	\$1625
Sport phaeton .....	1785	1675
4-pass. coupe .....	2075	1895
7-pass. touring .....	1585	1435
7-pass. sedan .....	2375	2195
4-cylinder models—		
Roadster .....	\$ 895	\$ 865
Phaeton .....	935	885
Coupe .....	1295	1175
Sedan .....	1395	1395
Touring sedan .....		1325

## RICKENBACKER'S 2,500TH CAR

DETROIT, July 28—Rickenbacker Motor Co. has completed 2,500 cars since getting into production in February. The occasion was celebrated at the factory by executives and distributors, together with a number of Capt. Rickenbacker's associates in the American flying unit, who were in Detroit as his guests. President B. F. Everitt declared the company was preparing to make a large increase in its production schedule.

## Complaints Against Tire and Accessory Firms Dismissed

**Federal Trade Commission Drops Charges of Violation of Resale Law**

WASHINGTON, Aug. 1—Formal complaints against seven automobile accessory and tire manufacturing companies were dismissed by the Federal Trade Commission, all of them charged with violations in respect to the resale price maintenance laws. The cases were dismissed by the government, without prejudice to its case, pending the final decision of the Beechnut Packing Case which was selected and advanced by the Federal Trade Commission as a test case.

The cases involve the right of a manufacturer to fix the resale price of manufactured goods. Pending the final adjudication by the United States Supreme Court the Commission has announced that no further complaints against manufacturers who manufacture a commodity and fix the retail prices will be made.

The seven companies against which the government dropped its prosecution are as follows: Kryptok Sales Co., New York City, lens manufacturers; Curtis & Co. Manufacturing Company, and Curtis Pneumatic Machinery Co., St. Louis, Mo., accessories; Goodyear Tire & Rubber Co., Akron, O.; Klaxon Co., Newark, N. J., automobile horns; J. H. Haney & Co., Hastings, Neb., tire pumps; Marshall Oil Co., trading as Tungsten Mfg. Co., Marshalltown, Iowa, spark plugs, and The Denver and J. E. Hunt & Co., Baltimore, automobile belt manufacturers.

## WHERE SERVICE MEANS SALES

ATLANTA, Ga., Aug. 1—The A. S. Hatcher Co., of Macon, Ga., has inaugurated recently an unusual plan that is resulting in a decided increase in the sale of new brake lining. The company has made an arrangement with 41 garages and service stations in Macon to inspect automobile brakes free of charge and to give the car owner honest advice as to whether or not the brakes can be made effective by adjustment, or if new brake lining is needed.

In advertising the plan the Hatcher company uses sufficient space in the newspapers to publish the name and address of the 41 stations where the automotive owner can obtain this free service.

## FORD PLANT SLOWS UP

OMAHA, Neb., July 29—The railway strike is beginning to cut in on the Omaha business houses, especially the automotive business.

The local assembly plant of the Ford Motor company has closed their chassis department and has laid off over 100 men in the last two days, according to W. A. Russell, manager of the plant.

## July Retail Sales Unusually High in Milwaukee District

Many Dealers Report Sales Best in History—Volume Generally Slightly Below June

MILWAUKEE, Wis., July 31—Retail sales of passenger cars in July, so far as records obtainable today tell the story, makes a remarkably good showing in comparison with figures for the same month in previous years. There are few dealers who cannot show a gain ranging from 25 to 300 per cent over the sales in July five years or longer, the month ending today represents the best and most active sales period in their existence.

Generally speaking, July business was only slightly below June or May, when as a matter of fact most dealers had expected a rather sharp drop, especially in comparison with May, for the reason that the experience of dealers here almost invariably indicated a sudden rush beginning about the middle of April and extending into early June, which could hardly be hoped to sustain itself for an indefinite period. Therefore the July showing is considered highly favorable.

August prospects are regarded as good, especially in view of the stimulation that wholesale as well as retail trade usually receives from the annual Wisconsin State Fair, at Milwaukee, Aug. 28 to Sept. 2. This event this year is looked upon to furnish the index of rural passenger car buying. So far this has been relatively much slower than the average, although better than in 1920 or 1921.

Motor truck demand is increasing slowly. Undoubtedly it has been helped by the railroad strike, not perhaps so much from immediate effect, but the methods and means being employed in anticipation of more serious developments. This refers more to the movement of freight than of passengers, although with respect to the latter truck orders now being booked in steadily increasing numbers.

### CENTRAL ILLINOIS SHOW

AURORA, Ill., Aug., 1—A large automobile show will be a part of the Central States Fair and Exposition, to be held at Aurora, Aug. 18-26. Spaces for 288 cars have been provided, and 41 makes are already entered and prepared to show all their models. No make will be shown unless its full line of models is exhibited.

L. L. Fest, assistant of Sam A. Miles in the management of the New York and Chicago national shows, is directing the exhibits for the exposition management.

### SPEEDOMETERS FOR MAIL TRUCKS

WASHINGTON, July 28—Bids for 3,000 speedometers have been requested by the Post Office Department for equipping

each United States mail truck in service. Heretofore it has been the practice of the Department to purchase trucks, usually of the cheaper makes, without speedometers. Drivers arrested for excessive speeding have always pleaded ignorance as to their speed, and to put a stop to speeding of mail trucks the Department has announced that it will equip all automotive vehicles, exclusive of passenger cars, with speedometers.

## Ford Studying Possibilities of Assembly Plant in Mexico

DETROIT, July 22.—The Ford Motor Co. stated that it has not yet definitely decided to erect an assembly plant at Tampico, Mexico, and that no action will be taken for several weeks, pending investigations now being made into Mexican trade conditions. Unless the company is convinced that the potential business warrants the erection of a plant, it will not be built. This business now is being served by shipment from the plant at Houston, Tex. While shipments are being made steadily they are not of record proportion as they were last year.

If it finally is decided to erect a Mexican plant, it will serve most of the territory and distribution in the United States will be changed somewhat to take care of the surplus production of the Houston plant.

It is recalled that, when the invasion of Mexico was discussed several years ago, Henry Ford said: "Let me invade Mexico with factories and give the people of that country something to do; then there will be no more war there."

### COATS COMPANY NOT ABSORBED

CHICAGO, July 28—George A. Coats, head of the Coats Steam Car Co., denies a report from Columbus, O., that this corporation has been taken over by the Stewart Motor Car Co. The Coats Steam Car Co. is a selling organization controlled by Coats to market steam passenger cars, trucks, buses and a special light delivery wagon. The Stewart company is a manufacturing concern which has been licensed to produce, under the Coats design, a car which will sell at \$1,085. It is one of a group of manufacturing companies which is expected to make the various Coats products.

### PREDICTS CHEAPER GASOLINE

WASHINGTON, July 29—The price which motorists will have to pay for gasoline, as a result of the investigation of the alleged gasoline "trust" by the Senate Committee on Manufacturers, will be lower when the Committee shall have finished its investigation. This was the assertion today by one of the Committee members, based on reports from more than 200 big oil companies, which have already complied with the Committee's summons to submit sworn statements of their business.

## Variety of Topics Discussed At Alabama Dealers' Meeting

Standard Form of Sales Contract and Abstracts of Title for Automobiles Advocated

BIRMINGHAM, Ala., July 29—The semi-annual meeting of the Alabama Automobile Dealers' Association was held in Birmingham Monday, with representatives present from all sections of the state. There were more than 100 visiting and local dealers in attendance.

The business session was held in the forenoon at the Tutwiler hotel, when a number of short addresses were delivered by local men and visiting delegates. During the afternoon the dealers enjoyed a barbecue on Little Cahaba river, tendered by Birmingham members of the association to their out-of-town guests.

The meeting was called to order by M. K. Johnson, of Montgomery, president of the state association. E. L. Scouten, president of the local association, extended a welcome to the visitors on behalf of the city, to which L. G. Adams of Mobile responded.

Freight rates were discussed by O. L. Bunn, manager of the Birmingham Chamber of Commerce, who declared that thousands of dollars in freight have been saved to the automobile dealers of Birmingham by the Chamber of Commerce.

Walter Brower, in an address before the meeting, advocated a standard form of sales contract for automobiles and suggested that abstracts be required for automobiles the same as for real estate. Stricter laws for the protection of automobile owners were urged by Brower.

A strong plea for a committee to investigate the present dealers' license fees, which he declared excessive, was made by Sterling Edwards, local dealer. L. G. Adams of Mobile maintained that factory discounts should be given only to legitimate agents, while Joe Lyons, also of Mobile, spoke in behalf of closer unity among the dealers of the state.

The association accepted an invitation extended by the Montgomery Chamber of Commerce to hold its next convention in the capital. The next meeting will be held in January.

During the afternoon business was forgotten while the automobile men ate, danced, talked, fished and frolicked at the picnic grounds on the Little Cahaba.

Officers of the Alabama association are: M. K. Johnson, president; I. J. Darsey, vice-president; Reese Adamson, second vice-president; Jim Farley, secretary, and L. D. Stephens, treasurer.

### FORDSON SHOW AT BALTIMORE

BALTIMORE, July 27—Under the auspices of the Ford Motor Co. and the Ford dealers of Maryland, Virginia and Delaware, the largest tractor exhibition ever held in this city has just closed.



## Gilcrest Sees Preference For California Type Top

### Wescott Salesmanager Bases Opin- ion on Investigation Among 5000 Typical Automobile Owners

DETROIT, July 28—In a letter to dealers and distributors of the Wescott car, E. H. Gilcrest, salesmanager of the Westcott company, predicts that the predominant type of automobile for the next few years will be the open car with the permanent California type of top.

He bases his opinion on an investigation made among 5,000 typical automobile owners. He found that a considerable majority expressed a preference for the enclosed car but that many were prevented from buying that type because of price. The second choice was overwhelmingly in favor of the open car with permanent top. Less than five per cent preferred the open car with collapsible top.

In his letter Gilcrest advises the dealers as follows:

"In short, the results of our investigation proved beyond question that the public's demand is rapidly centering on two types of cars—the enclosed car for the driver who can afford it and who does most of his driving in the cities, and the permanent top with winter enclosure for the majority of owners who appreciate combining all the advantages of the open car with most of the advantages of the enclosed type.

"Westcott dealers may confidently predict to their customers that the open car with a permanent top will be decidedly the car in vogue during the next two or three years, while the old-style bow top will rapidly become obsolete on the better grade of cars. Anticipating this trend, the Westcott company, some months ago, decided to make the California permanent type top standard equipment on their open models."

### TOTAL OF 24,456 DURANTS

NEW YORK, July 28—Durant Motors, Inc., turned out 5119 fours and 767 sixes, a total of 5886 cars, in June. July production will somewhat exceed 6500. June output was divided among the different plants as follows: Long Island City, 2587; Lansing, 2191; Leaside (Toronto), 341; Muncie, 767.

A total of 24,456 Durant cars now has been produced.

The first of the new Stars was delivered from the Long Island City plant Saturday. The company took formal possession of the Willys Corporation Elizabeth plant on Tuesday of last week. Large quantities of parts for the Star were on the sidetracks adjoining the factory ready to be unloaded, and it now will be possible to get into production within a very short time.

### CONSIDERING FOKKER'S OFFER

MILWAUKEE, Wis., July 28—Latest development in the Milwaukee campaign to secure the location of a new aircraft

enterprise sponsored by A. H. G. Fokker, the noted Dutch designer and manufacturer, is that a committee of 50 prominent business men is engaged in raising a \$100,000 fund. This will be used to make a survey to determine the possibilities of aerial transportation in the United States and the merits of Milwaukee as the center of operations, both of production and of passenger and commercial transportation.

Fokker departed from Milwaukee July 18 to sail from New York July 22. His confidential adviser, Frits Cremer, accompanied him to New York, but will return at once to conduct the survey financed by Milwaukee capital.

### CHANGES AT RUBBER PLANTS

AKRON, Ohio, July 22.—Changes in personnel in the sales department of the Star Rubber Co. have been announced during the past week. Arthur G. Shirk, formerly with the Goodyear Tire & Rubber Co., has been named assistant sales manager. C. E. Armstrong has been given Eastern territory. L. I. Ris, formerly with the company, has been placed in charge of sales in Eastern and New England states. C. A. Reece has been placed in charge of sales promotion.

At the B. F. Goodrich Co. it is announced that L. A. McQueen, formerly assistant to E. D. Gibbs, advertising manager, has been placed in charge of a newly created sale promotion department.

Frank Griffins will probably be placed in charge of a new factory paper which is being planned by the Seiberling Rubber Co.

### USED CAR STORE SUCCEEDS

BIRMINGHAM, Ala., July 29—The used car store of the Brownell Auto Co., which is in charge of C. E. Walters, has proven so successful that the concern, unable to supply the demand for its used machines, is now buying cars from individuals for re-sale. The plan is declared to have solved the used car problem for the Brownell company. It consists of keeping the used cars separate from the new machines, by placing them in a building a block away, where they are displayed to best advantage, after being washed and tightened up and the engines tuned up where necessary. It is declared by Walters that the plan has been more than successful during the three months the used car store has been open, and that it is impossible to meet the demand for the used machines.

### MASON TIRES REDUCED

AKRON, July 29—The Mason Tire & Rubber Co. announces price reductions averaging a little more than 20 per cent on all sizes of cord tires. The 30x3½ clincher has been cut from \$18.75 to \$13.95 and a new straight side 30x3½ line has been added at \$15.85. The company also has cut its prices on fabrics in Ford sizes. The 30x3 has been reduced from \$11.90 to \$9.25 and the 30x3½ from \$13.50 to \$10.60.

## Chandler Head Predicts Good Business Next Six Months

### George M. Graham Completes Tour on Which He Visited Distribu- tors in 41 States

CLEVELAND, July 31—Indications of big crops in most parts of the west, and the improvement in prices, together with the easing of money undoubtedly will have the effect of still further stimulating business, according to George M. Graham, vice-president of The Chandler Motor Car Co., who has just returned to the company's factory in Cleveland from a visit to distributors that extended to the Pacific coast.

"Everywhere throughout the west remarkable optimism is expressed concerning the business situation," said Graham.

In commenting on the automobile industry in particular, he said that the public is displaying marked discrimination in concentrating its preference on the product of sound and stable manufacturers who are backed by years of experience and by ample financial resources.

During the past six months Graham's tour of Chandler distributor points, has taken him from coast to coast. He stopped in 41 of the 48 states.

"In almost every place throughout the United States, but particularly in the region west of the Mississippi," said Graham, "I found an expectation that business will continue to improve throughout the next six months."

### DAVENPORT SALES GROW

DAVENPORT, Iowa, July 28—Growth of sales of cars around \$1000 has been the outstanding feature of an analysis in this city just completed by a statistical company. June sales were 187 cars, reported by all agencies in the city, as against 141 sales in June, 1921, and for six months ending July 1 sales have totaled 816 cars, as against 738 in the corresponding period last year. The car selling in greatest number was bought by 81 persons in June, making 390 sales of this particular car by one agency in the six months.

### JORDAN PRODUCTION RECORD

CLEVELAND, O., July 29—The Jordan Motor Car Co. established a new production record in June, the output exceeding that of May. The company carried into July 900 orders which it was not possible to fill in June. These unfilled orders, together with the regular schedule of 1,000 cars for July, are sufficient to keep the factory busy until Sept. 1.

### PHILADELPHIA TRADE "SPOTTED"

PHILADELPHIA, July 31—Automobile dealers here say trade is good, but houses dealing in motor trucks report them little in demand. Tire and accessory houses, for the most part, report trade spotty and collections slow and difficult.

## Steps Taken to Organize Oregon State Association

### Multnomah County Trades Body to Be Basis of New Automobile Business Federation

PORTLAND, Ore., July 29—Formation of the Multnomah County Trades Assn., a new body which it is proposed will be a stepping stone toward the formation of a successful state-wide association, was completed in Portland this week by the election of directors for the association by the Portland Automotive Trades Assn. and the Automobile Dealers Assn. of Portland.

The new county association has been brought into being virtually through the loose union of the dealers and trade association bodies of Portland. Under the plan each of the two bodies will be independent and self governing units in the larger association. A constitution was recently drawn up and adopted.

Other separate associations, such as the Rubber Assn., the equipment jobbers and others, will be eligible to join on the same basis and it is expected the membership will be rapidly enlarged. The purpose of the body will be to work for the good of the automobile industry as a whole, fight unjust taxation, inimical legislation, and other activities, with each of the separate units being left full jurisdiction over their particular fields.

The Multnomah county association is to be the foundation of a state-wide body to be known as the Oregon Automotive Trades Assn., which will be launched within a few weeks, it is stated. This body is to be a loose federation of the various associations in the automotive industry throughout the state, patterned after the California and Washington state associations.

Directors who were elected this week to the Multnomah county association by the dealer and the trades bodies of Portland are as follows: For the Automobile Dealers Assn., Jack Crittenden, A. B. Manley and C. L. Boss; for the Automotive Trades Assn., Fred Dundee, C. H. McGirr, A. E. Foss, R. D. O'Brien and Edward Burke.

### DEALERS' SECTION SHIFTS

HARTFORD, Conn., July 31—A number of Hartford motor car and truck dealers have crossed the Connecticut river to East Hartford and have developed quite a section. Rents are high in Hartford for which reason the over-the-river section appealed.

David B. Roberts, head of the Hartford Buick Co., was the first to cross the river. G. M. C. followed the Buick and then S. A. Miner, Inc., with the Pierce-Arrow, put up a new sales room and service building. The Bennett Hartford Co., with the Ford; The Charter Oak Machine Co.; Walter S. Halliwell, Inc., with Mercer and Moon, and the Thomart truck, F. W. Dart, Inc., The R. D. Britton

Co. and the Bowman Motor Car Co. have followed suit. With two exceptions, these firms engaged in car sales are members of the Hartford Automobile Dealers Assn.

### Gordon Lee Visits Oregon Dealers on Western Tour

PORTLAND, Ore., July 31—Gordon Lee, head of the automotive division of the United States Department of Commerce, was an Oregon visitor last week, spending six days in the state, three days in the city of Portland. Lee is on a tour of the Pacific Coast visiting automobile dealers and speaking before the trade associations, telling of the work and plans of the automotive division for the aid of the industry.

Lee spoke Saturday evening before the Medford and Ashland dealers. Sunday he spent at Crater Lake National Park and on Monday he visited Salem, the state capital, and addressed the Salem dealers. Reaching Portland on Tuesday, he addressed the men of the automobile industry, gathered nearly 100 strong at a local hotel, and was the leading speaker before the Portland Ad club on Wednesday. On Thursday he was taken over the Columbia river highway by Portland automobile dealers, and that night left for Olympia, Wash., to attend the annual state convention of the automobile associations there on Friday and Saturday.

### MOTORCYCLE PRICES REDUCED

NEW YORK, July 28—Heavy price cuts have been announced by three leading motorcycle companies on their 1923 models which have just been introduced. The Excelsior Motor and Manufacturing Co. of Chicago have reduced prices on the Excelsior Twin and on the Henderson Deluxe as follows:

	Old Price	New Price
Excelsior .....	\$365	\$310
Henderson .....	475	398

The Ace, another four-cylinder machine, has been cut from \$435 to \$335. It is made by the Ace Motor Corp. of Philadelphia.

The price of the Nearacar has been brought down from \$225 to \$185, making this machine now equal in price to the Cleveland.

Other motorcycle price cuts are expected within the next two weeks. The other leading twin-cylinder jobs will probably be priced somewhere in the neighborhood of the Excelsior, when new models are announced.

### HEAVY JULY SALES IN HARTFORD

HARTFORD, Conn., July 31—Never before in the history of the motor car industry in this section has business been so good in July as now. It is rather significant that while Hartford department stores are having special sales to move goods and the stores are not patronized as heavily as might be hoped for, the automobile dealers for the most part are showing depleted or empty salesrooms.

## S. A. E. Truck Division Examine Safety Formula

### Meeting Called on Strength of Letter From B. B. Bachman

DETROIT, July 29—Twenty-four members of the Truck Division of the Standards Committee of the Society of Automotive Engineers met here this week to examine the possibilities of a safety formula for trucks. Discussion developed the opinion that in order to meet the requirements of the motor vehicle departments of the various states it would be necessary to include in the formula suitable static factors of safety on the axles and steering gear as well as a retardation test.

The meeting was called largely as a result of a letter to B. B. Bachman, president of the S. A. E., from A. L. McMurtry, of the Motor Vehicle Department of Connecticut, asking for immediate help on a formula which would enable the state authorities to use definite requirements as a basis on passing on the safety of trucks seeking licenses. The measure is particularly necessary in view of trucks assembled from units of doubtful or ancient origin.

A sub-committee has been appointed with instructions to take the matter under immediate advisement.

Some discussion also was engaged in regarding the new small wheel and large diameter tire sizes, which brought to light the fact that truck manufacturers are somewhat dubious as to the matter of clearance under the brake drum and overhung bearings with these wheels.

### PATENT SUIT OVER STEEL WHEELS

DETROIT, Aug. 1—Considerable litigation over disc steel wheels is likely to follow the filing of a suit in the United States District Court at Chicago by the Detroit Pressed Steel Co. against the Forsythe Bros. Co., of Harvey, Ill., alleging that the defendants have infringed upon patents owned by the Detroit company.

The Detroit Pressed Steel Co. manufactures Disteel wheels and in a statement issued subsequent to the filing of the suit the company claims that its patents give it virtually exclusive rights to the manufacture of steel wheels. The statement intimates that other suits will follow unless manufacturers making steel wheels enter into licensing arrangements with the Detroit company.

### KENT HEADS AUBURN CO.

AUBURN, Ind., July 17—Appointment of A. P. Kent as president and treasurer of the Auburn Automobile Co. has been announced by the company. At the same time J. I. Farley was appointed first vice president. Both men have been connected with the Auburn company for a number of years.



## IN THE RETAIL FIELD

Electric Storage Battery Co., of Philadelphia, has opened several departments in its Crescentville plant, built at a cost of approximately \$2,000,000 and will be operating it in full by October, according to Herbert Lloyd, president.

American Motor Body Co., successor to the Hale & Kilburn Co., is now operating at 50 per cent of capacity, with the schedule to be gradually advanced until November, when it will be at 100 per cent. Night work is necessary at present in some departments.

Elmer Automobile Co., the oldest distributor of the Ford in Connecticut, recently acquired new and larger quarters in the town of Bristol. Saturday evening there was a formal opening preceded by an automobile parade in which managers from the company's eleven branches throughout the state were present.

The Hartford branch of the York Motors Corp., Lincoln distributor, is now handling the Ford line, the latter being displayed on the same floor with the Lincoln.

A. S. Austin Motor Co., of Kansas City, Mo., made the announcement recently that it had taken over the agency in this territory for the Ruggles Motor Truck, which is manufactured in Saginaw, Mich.

### DALLAS BATTERY MEN ORGANIZE.

DALLAS, TEX., July 29.—The Dallas Battery Men's Association has just been organized. The purpose of the organization is for developing a closer co-operation between the battery dealers and service stations in the city and a uniform service at all stations. J. H. Meyers, general manager of the Ray Battery Sales Corporation, is the president and William Tobian, manager of the Gould Battery Co., is secretary-treasurer. Rodger Tennant, of Tennant Brothers, is vice-president of the organization. The association was started with 23 battery men as members. One week after the organization 34 battery concerns, practically all of such companies in the city, were members.

The new association will shortly start a campaign to educate the automobile owners in the necessity of caring for batteries and why automobile batteries should not be tampered with by inexperienced workmen.

### MORE TOURISTS THIS YEAR.

FORT WAYNE, IND., July 29.—Local auto highway information headquarters state that fully 25 per cent more tourists are passing through this city this year on the various important highways which go through Fort Wayne than passed through last year. The Yellowstone Trail and the Lincoln Highway are getting the greater portion of the travel. Tourists who also went through this city on the various highways last year state that the roads this year are in much better condition than they were last year.

### NEWS OF BOSTON DEALERS

BOSTON, July 28.—In recognition of his sales efforts in building up a big business, the Reo Motor Car Company has granted to James M. Lincott, its oldest and largest distributor, greater territory by placing the entire state of Vermont under his organization. He has Massachusetts east of and including Worcester County and all of New Hampshire.

The franchise for the Lexington car in Northwest Texas has been taken over by the Postoffice Garage of Dallas. In taking over the franchise the Postoffice Garage also took over all the parts and supplies for the Lexington carried by The Keith-Patterson Motor Co. The parts have already been transferred to the new owners.

The agency for the Steel Wing Shock Absorber in the Houston, Tex., territory, some forty counties, have been taken over by the Indeeda Tire Co. This absorber can be installed in 25 popular makes of cars, Frank Treadway, manager of the tire company, said. Agencies will be established in various towns and cities of the district immediately, it is planned.

The name of the Universal Motor Co., Little Rock, Arkansas distributors for the Hupmobile, has been changed to the Owen-Hill Motor Co. There has been no change in the board of directors, stockholders or management of the concern.

L. & H. Motor Co., Hartford, Conn., Hupmobile distributor, has added the Jones Motor Sales Co., of East Hartford, to the growing list of associate dealers. L. & H. control nearly all of the state and are in the midst of a very aggressive sales campaign.

Sherwood Hall, original Paige Detroit distributor in Boston, and later handling the Hupmobile line for Metropolitan Boston, has sold out his various enterprises here and started for California to settle permanently.

Vice-President W. O. Rutherford, of the B. F. Goodrich Company, has been in Boston on the way to the North Shore summer colony, where he and his family occupy one of the finest estates off the Gloucester rockbound coast.

J. P. MacNeil, of Farley & MacNeil, has just returned from a factory trip among the tire companies to take on a line, and finally selected Keystone, which he sells on a "Pay As You Ride" plan.

### Enclosed Cars Are 49 Per Cent of Franklin's Output

SYRACUSE, N. Y., July 28.—Enclosed cars aggregated 49 per cent of the shipments from the Franklin Automobile Co. during the second quarter of the year ending June 30, sedans alone forming 37 per cent of the total. In addition, shipments of demi-sedans and demi-coupees (convertible enclosed models) amounted to 10 per cent of the total.

Shipments for the quarter aggregated 3,321, or at the rate of better than 13,000 cars annually. This represents an increase of 18 per cent over the corresponding period last year. The quarter just passed is the second largest in the history of the company, being surpassed only by the first quarter of 1920, and then by the narrow margin of 30 cars.

### NEW LOCOMOBILE COMPANY

NEW YORK, July 29.—Following the acceptance of the presidency of the Locomobile Co. by W. C. Durant, it is announced that the present Locomobile Co. will be superseded by a new corporation to be known as the Locomobile Co. of America. The new company has been incorporated in New York with a capital of 600,000 shares of no par value stock. Durant, who heads the new company, has issued a warning to the public against trading in the stock of the old company which has been offered on the curb markets.

## No Slump in Retail Sales In New York as July Ends

### Recapitulation of Six Months' Business Shows Remarkable Records Made by Some Dealers

NEW YORK, July 31.—Distributors and dealers of the metropolitan territory have gone into the last days of July without experiencing what might be termed a real slump in passenger car sales. The June selling record, of course, is not being equalled, but orders in the majority of establishments are running above what the trade has expected and the seasonal decline is so slight that it would hardly be termed normal up to this time.

Dealers are beginning to get recapitulations on the first six months' business and, in some cases, results have been little short of amazing. One distributor, handling a car outside of the first 15, had a retail sales record in New York for the first four months of the year which ran far ahead of the entire year 1921, and sales for the first six months were 275 per cent of all of 1921. More than a dozen distributors and branches could easily be found on Broadway with sales of the first six months running 100 to 150 per cent of the total for 1921. There is still a shortage of cars with several of the dealers in the fastest selling lines. Others are suffering from a shortage of closed cars, owing to a demand for these models which is running ahead of factory expectations even for the metropolitan territory.

The low-priced enclosed jobs, including those with soft tops, have been in heavy demand right along. Such cars as Hudson and Essex coaches, the Nash Cabriole, Hupmobile coupe-roadster and the Dodge Brothers business coupe have been selling heavily and distributors are far behind on deliveries. The territory is in good shape on used cars, generally speaking.

The used car market has fallen off since the latter part of June, but stocks have not approached an alarming stage and expected care in trading from now on probably will prevent anything resembling a crisis, provided business holds reasonably good throughout the year.

### KOKOMO FACTORIES BUSY

KOKOMO, July 28.—Ninety-seven factories of Kokomo are now employing labor to within ten per cent of the normal rate, it is stated by C. C. Phillips, examiner of free employment for the federal government. The Haynes plant, which is said to be at normal when 1,600 people are employed, now has 1,800 at work. Kokomo Rubber is another of the automotive plants that is at full operation with 425 workers. Haynes-Stellite is another that is said to be above normal, while the Apperson plant, at the time of the report, was somewhat below normal because of inventory.

## BUSINESS NOTES

Lenox Tire Corp. is the style of a new corporation opened at 2521 Indiana Ave., Chicago, to deal in tires, tubes and accessories.

Tourist Camp Body Co., 1726 Prairie Ave., Chicago, will manufacture and deal in automobile and other vehicle bodies and accessories.

Globe Battery Co., Chicago, has changed its name to World Battery Co.

National Products Co., 2007 Michigan Ave., mercantile and manufacturing business, has been incorporated in Chicago.

U. S. Light & Heat Corporation, of California, has been organized and incorporated as a subsidiary of U. S. Light & Heat Corporation, of Niagara Falls, N. Y., manufacturers of USL storage batteries, railroad car lighting devices and electric arc welders. A site has been leased and construction started on a new plant in Oakland. It is expected that production will start in the new factory about Oct. 1.

Announcement is made that Walla Walla had been selected as the distributing center for the states of Washington, Oregon and Idaho for the Piedmont Motor Company, of Lynchburg, Va. The Piedmont company has been building and distributing cars in the east for seven years and is invading the west for the first time. J. A. Carson, formerly with the Tierney Toner Company, will be the distributing agent.

Connecticut Valley Motor Sales, Inc., Springfield, Mass., has taken the agency for the Jewett and will continue to distribute the Paige and Dort in that territory.

Costigan & Pinney, Springfield, Mass., have expanded their business of making automobile tops and upholstery and repairing bodies, and have moved into larger quarters, with connecting garage and facilities for repairing bodies.

Permission has been given Harry N. Kraft, 26 Summit avenue, Buffalo, N. Y., to erect a 1200-car garage on the site of the Mohawk brewery at South Elmwood avenue and Mohawk street. Construction will be immediately begun, according to Mr. Kraft.

Matthews Tractor Co., of Buffalo, N. Y., is moving its plant to Brockport, where it has secured quarters in the building formerly occupied by the Wilson garage.

J. P. Nielsen & Sons, Hartford, Conn., have doubled their floor space with a new substantial addition to the Maple avenue sales and service establishment.

The factory branch of the Republic Motor Truck Co., which was established at Kansas City recently, has announced the personnel of its office and shops. J. A. Keating, who was formerly vice-president of the P. J. Downs Motor Co., is branch manager. Lester Morgan, who was with the local distributing company before the institution of the factory branch, is retail sales manager. John Smith, formerly connected with the Master Truck Co., of Wichita, Kan., has charge of the entire sales department. R. C. Marshall is manager of the used car department.

A chain of automobile service stations in Spokane and throughout Washington will be installed by the Consolidated Rubber Corp. at a cost of approximately \$250,000. Construction is expected to start within the next few weeks. Spokane will be headquarters of the company and a distributing point for shipping of supplies. Eight service stations will be installed in Spokane and the first one is now in process of construction on Grand avenue, near the Palouse highway. Announcement of plans of the company is made by C. A. Roberson, president.

Oakland Motor Co., which recently established a factory branch in Kansas City in order to replace the dealer plan formerly used, has announced its office and shop personnel. A. P. Ten Brook, head of the former distributing company, is general branch manager. H. A. Brewer, associated with the concern four years, is manager of the service department. E. G. O'Reilly, who was with the company five years, is superintendent of shops. M. H. Schandler, a new man in the organization, has been made shop foreman.

Production of the Columbus Tire & Rubber Co., Columbus, O., has reached a point where a day and night force are maintained. The production in June exceeded that of May by fully 50 per cent and a total of 150 men are employed at the factory.

## Ford Sales Established New High Record in June

DETROIT, July 28—Sales of Ford cars, trucks and tractors established a new record in June with a total of 148,439, an average of 5,709 a day. Sales by the Ford company of Canada were 6,054 and 9,435 were sold by the European and South American branches.

With the closing of business for June, records showed that the total sales for the first six months of 1922 were 652,251, which is materially ahead of any previous half-year record.

July Ford sales are expected to equal and probably exceed those of June. Schedules have been fixed at 151,767, although dealer orders call for more than 200,000. The company has been unable to keep pace with the demand for enclosed models.

Ford truck sales up to this time show an increase of 84 per cent over last year. Ford now is employing 75,000 men in Detroit.

## GEAR COMPANY ENJOINED

NEW YORK, July 29—A permanent injunction was granted the Torbenson Axle Co. restraining the United Gear Manufacturers Corp. from using the Torbenson name in the selling of parts for Torbenson axles, said parts not being made by the Torbenson company. The injunction was granted on July 6 by Justice Knox in the United States District Court.

## DENBY TRUCK PLANT SOLD

DETROIT, July 29—L. A. Young Industries, Inc., manufacturers of automobile equipment and material, has bought the plant of the Denby Motor Truck Co., which adjoins it in this city, and is preparing to extend its manufacturing facilities. With the Denby property and an addition to its present plant, now building, it will have an additional 300,000 sq. ft. of space for manufacturing.

The Denby company will continue its truck manufacturing business in two of the buildings of its former property, having taken a lease on these for a year while preparing to move to another manufacturing site. The sale of the property gives the Denby company a large addition to its working capital.

## INDUSTRIAL MOTORS OPERATIVE

NEW YORK, July 29—The merger of the Selden Truck Corp. and the Atlas Truck Corp. has been declared operative, and the Industrial Motors Corp., which is to take over the two companies, has been organized under the laws of the State of Delaware with an authorized capital stock of 1,000,000 shares of no par value.

John J. Watson, Jr., president of the new company, said that no new financing would be necessary. The balance sheet of the combined company will show assets of \$2 to each dollar of liabilities and the Selden company only about \$1,000,000.

## Minnesota Garage Owners Offer Golden Rule Service

### State Organization Issues Pamphlet Containing Standards of Fair Practice

MINNEAPOLIS, Aug. 1—"Better service for the motorist" is the aim of the Minnesota Garage Owners' Assn., which is issuing a pamphlet containing the names of the authorized garage men of the state, who display the emblem of the better service organization. In this pamphlet the Garage Owners' Association of Minnesota guarantees fair treatment at any member garage and each tourist is urged to look for the emblem. Complaints are to be reported by tourists to Secretary L. G. Wilcox, 343 Andrus building.

The standards of service offered the tourists of the state are as follows:

"First—To be worthy of our vocation.

"Second—To increase our efficiency so that we may be better able to render the highest standard of service possible.

"Third—To meet every customer more than half way, being really glad to see him and glad to help him.

"Fourth—To hold that the exchange of our goods and our service for profit is legitimate and ethical, provided that all parties in the exchange are benefitted thereby.

"Fifth—To realize that satisfied customers are our best assets and that without them no business can expect to grow and prosper.

"Sixth—To realize that promises broken mean confidence lost.

"Seventh—To endeavor, in all cases where misunderstandings arise, to adjust same to the best interest of all concerned.

"Eighth—To build between our customers and ourselves that feeling of mutual respect and confidence that is engendered by fair dealing and honest service.

"Ninth—To submit any grievance that cannot be adjusted between ourselves and our customers to an arbitration committee appointed by the president of the Garage Owners' Assn.

"Tenth—To understand that membership in this association means fair and square dealing to all; basing our entire relation with our customers on the law of the Golden Rule."

## NEW STANDARD FOUR

BUTLER, Pa., July 31—The Standard Motor Car Co. will soon be ready to market a four cylinder car, which will be a companion to the Standard eight. The new Standard factory buildings recently completed at the Butler, Pa., plant are well appointed to take care of volume production. The main assembly building is 800 feet long, 200 feet wide, two stories and equipped with track system of progressive assembly.



## CONCERNING MEN YOU KNOW

H. C. Trent, until July 15 assistant manager of the New York branch of the Willys-Overland, Inc., has been appointed secretary-treasurer of the Colt-Stewart Co., distributors of the Maxwell-Chalmers line in New York City and surrounding territory.

A. M. Reeves, manager of the Hartford branch of the Gill Piston Ring Co., has been transferred to the Baltimore branch as manager. Reeves opened the Hartford branch in February, 1921.

W. G. Harris, Hartford, Conn., manager of the Hartford branch of the York Motors Corp., has resigned. The branch is now in charge of P. C. Nelson.

C. A. Bence, New Britain, Conn., has taken on the Lexington in that territory. He formerly had the Buick.

C. E. Emory, formerly manager of the Hartford branch of Hare's Motors of Connecticut, has joined the sales force of the L. & H. Motor Co., Hupmobile distributors.

Harry W. Anderson has resigned as general sales manager of the Duesenberg Automobile and Motors Co., Inc., of Indianapolis. He has not announced his plans for the future.

Paul Leidy, formerly secretary of the Michigan Drop Forge Co., Pontiac, has moved to Ann Arbor, where he is taking a course in the college of law.

Andrew J. Casskey, Hartford, Conn., sales and service representative of the Rayfield carburetor, has purchased the Riverside Hotel at East Had-dam and is converting it into an automobile inn.

Glen Harkrader, formerly sales manager of the No-Leak-O Piston Ring Co., has been appointed territorial representative for the Indiana Piston Ring Co., of Hagerstown, Indiana, in the territory west of the Mississippi and in Minnesota, Wisconsin and Illinois.

Frank Briscoe, president of the Briscoe Devices Co., Pontiac, has been enjoying a two weeks' vacation in Maine.

Vance H. Day, general sales manager of the General Motors Truck Co., Pontiac, left July 25 for Minneapolis to attend a district sales convention and will tour to Yellowstone National Park.

George H. Hannum, president and general manager of Oakland Motor Car Co., Pontiac, and C. J. Nephler, sales manager, were honor guests at a banquet given by the Pontiac Retail Merchant's Bureau, July 19, to mark the end of Mr. Hannum's first year with the Oakland.

Ben R. Hall, vice-president of the New England Securities Co., Kansas City, has just become vice-president of the Automobile Club of Missouri for the entire state and president of the advisory board of the Kansas City division.

### S. A. E. MEETING OCT. 26

NEW YORK, July 28—A national meeting of the Society of Automotive Engineers will be held in Detroit, Oct. 26 and 27, to discuss problems of automotive production. Papers relating to production problems will be read at the morning sessions each day and the afternoons will be devoted to factory inspection trips. These inspections will appeal particularly to tool, inspection and production men.

A dinner will be held the evening of Oct. 26. K. L. Herrmann is chairman of the committee which is arranging the program.

### FARMERS HAVE GOOD OUTLOOK

ST. LOUIS, July 29—After a two weeks' trip through Nebraska and Iowa F. H. Rengers, general sales manager of the Moon Motor Car Co., has returned convinced that the farmers in those two states are going to be fairly prosperous this fall and will be in the market for a great many automobiles. He found that farmers had placed many orders with dealers subject to cancellation if it did not rain by July 1. It rained and the orders were confirmed.

### POST OFFICE BUYS TIRES

WASHINGTON, July 31—The purchase of \$300,000 worth of automobile tires has been announced by the Post Office Dept. in anticipation of their use on automobile trucks to be used in the transportation of mails as a result of the rail strike.

### AGAIN WINS SALES CONTEST

BOSTON, July 28—The June sales contest of Cadillac dealers in the territory of the Cadillac Automobile Co. of Boston was won by John Bates of Woburn, Mass. This was the second monthly contest won by Bates and the prize this time was a mate to the chestnut gelding which was awarded to him as winner of

the May contest. Second place was won by Johnson Brothers of Norwood. This prize was a block of General Motors stock.

In the retail sales staff contest, Harold D. Bornstein won first place. E. G. FitzHenry and Walter C. Crane were second and third, respectively. The prizes were awarded by Albion L. Danford, president of the Cadillac Automobile Co. of Boston.

### HUFFMAN REDUCES PRICES.

ELKHART, IND., July 29.—The Huffman Brothers Motor Co., has announced a reduction of \$400 in the price of the Huffman Light Six passenger car. The prices are now as follows:

Model	Old Price	New Price
3 pass. roadster.....	\$1795	\$1395
5 pass. phaeton.....	1795	1395
5 pass. sedan.....	2695	2295

Reductions are also announced on Huffman trucks, as follows:

Model	Old Price	New Price
Model "B" (worm drive), 1½-2 ton .....	\$1795	\$1795
Model "C" (internal gear), 1½-2 ton .....	1795	1695

The new Model "D" Huffman truck, 2½-3 ton capacity, is just entering production, and prices on this model will be announced soon.

W. L. and L. R. Huffman have become personally active in the management of the company, and the following official personnel is announced: President, W. L. Huffman; treasurer, L. R. Huffman; secretary, H. R. Foreman.

### NEW KELLY-SPRINGFIELD TRUCK.

SPRINGFIELD, O., July 28.—A new model truck known as K-61 has been announced by the Kelly-Springfield Motor Truck Co. The specifications are as follows: 5-7 ton capacity, 4½x6½ engine, tires 36x6 front, 36x7 dual rear. The price of the chassis is \$4800.

## Ups and Downs of Prices Upset the Tire Industry

### Some Companies Raise, Others Lower, While Competition En- dangers Quality

AKRON, O., July 28—Price cuts, price increases, and production of cheap tires to meet so-called "gyp" competition by some of the larger rubber companies have added materially to the demoralization of the automobile tire industry in Akron.

The Mason Tire & Rubber Co. has announced a 28 per cent reduction in its entire line and also announced a new over-sized, non-skid, air-bag cured Ford cord tire to sell for \$11.80.

The Fisk company also has announced a reduction.

At the same time the American Rubber & Tire Co. announced an increase in its cord tire line of 5 to 10 per cent.

The Mason company stated in its announcement that the time has come to bring tire prices definitely to rock bottom to prepare for fall business and spring dating orders.

"We made a thorough canvass of our dealers before making the announcement regarding an increase in tire prices and we feel that they will support us in this move," H. L. Hauck, general manager of the American company, stated.

"We placed the proposition of increasing prices and maintaining quality or cutting the price and decreasing quality squarely up to our dealers. We explained the predicament in which we found ourselves and we have been agreeably surprised at the manner with which the dealers backed us in our suggestion of price raising," Hauck said.

For the present the increase is confined to cord tires and it is not likely that the increase will be extended to fabrics because of the small number of fabrics still made, according to company officials.

Official confirmation of the production of new brands of tires to meet the cheapest possible competition cannot be obtained at the larger factories but dealers report they are being flooded with announcements regarding tires.

The tendency has been downward in price and quality during the past year. Last year, cut followed cut in the tire field. This year special discounts and quiet reductions have replaced the out and out reduction while the manufacture of low cost cord tires in fabric tire sizes has pointed the way to lower cord prices as well as lowered quality in this field.

### DURANT PUBLISHES MAGAZINE

NEW YORK, July 29—Durant Motors, Inc., has blossomed out as publisher of a house organ for dealers, entitled "Durant Success." In addition to information about the Durant line of cars and the facilities for making and developing them, the publication has an interesting section devoted to the activities of Durant dealers.

# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### Holding Car for Repairs Under W. Va. Vehicle Law

Q—Publish the motor vehicle law for Virginia, especially about holding cars for repairs.—J. A. Heisler, Richmond, Va.

A—The salient points in the Virginia law pertaining to the lien of a garage-keeper on automobiles left for repairs, or for storage, or other service rendered by the garage, are found in the Code of Virginia, unannotated, issued in 1919. Since that date there have been no changes in the statute.

Section 6443, page 2132, gives a lien to mechanics for repairs as follows:—"Every mechanic, who shall alter or repair any article of personal property at the request of the owner of such property, shall have a lien thereon for his just and reasonable charges therefore, and may retain possession of such property until such charges are paid.

Section 6445, page 2133, gives a lien to a garagekeeper for keeping and care of automobiles in these words:—"Every keeper of a livery stable or garage, and every person pasturing or keeping any horses or other animals, vehicles, or harness, shall have a lien upon such horses and other animals, vehicles, and harness, for the amount which may be due him for the keeping, supporting and care thereof, until such amount is paid."

These two sections are but statutory statements of the older common law on the subject. But the garagekeeper is given a more effective remedy in the enforcement of his lien by the Virginia statute, as follows:

"Section 6449. Enforcement of liens acquired under sections 6443-6445. Any person having a lien under sections 6443 and 6445 of this Code—except where otherwise provided, having a lien as such at common law on personal property in his possession which he has no power to sell for the satisfaction of the lien, if the debt for which the lien exists be not paid within 10 days after it is due and the value of the property affected by the lien does not exceed twenty dollars, may sell such property, or so much thereof as may be necessary by public auction for cash, and apply the proceeds to the satisfaction of the debt and expenses of sale and the surplus, if any, he shall pay to the owner of the property. Before making such sale, he shall advertise the time, place, and terms thereof, in such manner as to give publicity thereto, and also, give to the owner, if he be in the county or corporation, 10 days written notice of the same and of the amount claimed to be due.

If the owner cannot be found in such county or corporation, posting the notice

### The Readers' Clearing House

*THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.*

*In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.*

*Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.*

*Addresses of business firms will not be published in this department, but will be supplied by letter.*

*Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.*

at three public places therein shall be sufficient service thereof. If the value of the property be more than \$20, but does not exceed \$300, the party having such lien, after giving notice as hereinbefore provided, may apply by petition to any justice of the county or corporation wherein the property is, or, if the value of the property exceed \$300, to the circuit or corporation court of such county or corporation for the sale of the property; and if, on the hearing of the case on the petition, the defense, if any made thereto, and such evidence as may be adduced by the parties respectively, the court or justice shall be satisfied that the debt and lien are established and the property should be sold to pay the debt, such court or justice shall order the sale to be made by the sheriff or sergeant of the said county or corporation or any constable thereof, who shall make the same and apply and dispose of the proceeds in the same manner as if the sale were made under a writ of fieri facias. If the owner of the property be a resident of this State the notice required by this section may be served in the mode prescribed by section 6041. If he be a non-resident, it may be served by posting a copy thereof in three public places in the county or corporation wherein the property is."

Now section 6041 for mode of serving notice follows: "A notice, no particular

mode of serving which is prescribed, may be served by delivering a copy thereof in writing to the party in person, or, if he or she be not found at his or her usual place of abode, by delivering such a copy and giving information of its purport to any person found there, who is a member of his or her family and above the age of sixteen years; or if neither he or she, nor any such person be found there, by leaving such copy posted at the front door of said place of abode."

If this service is made by one other than an officer the return as to time and manner of service must be sworn to by the party serving the notice.

### REBORING WAUKESHA ENGINE

Q—Would it be policy to rebore a Huber tractor engine out  $\frac{1}{4}$  inch per cylinder larger? If not, why?

1—We would advise against reboring the Waukesha engine or the Midwest engine which are both used on the Huber because the removal of  $\frac{1}{4}$  inch of metal from the cylinder bore would weaken the cylinder walls to such an extent that they would not be able to withstand the stresses imposed by the expansion pressures of the power stroke. A maximum of  $\frac{1}{8}$  of an inch larger diameter is allowable in regrinding the cylinders of either of these engines.

2—If reground to this size how much additional power could be added?—E. W. Davis Auto Co., Morrill, Kansas.

2—This is impossible to state as only dynamometer test could determine how much power is added by the increase in piston displacement. Theoretically increasing the bore  $\frac{1}{4}$  of an inch should show additional power to the extent of about 10 h. p.

### COPIES OF "SHOP PROFITS"

Where can a copy of "Shop Profits," the book published by the Automotive Equipment Association, be obtained. I have read of this Book in Motor Age.—E. H.

This question has been received from a number of subscribers. This book is published by the Merchandising Committee of the Automotive Equipment Ass'n, Suite 1818 City Hall Square Bldg., Chicago. This book is compiled to accompany the film "Shop Profits" which is planned to be for the shop what "Ask 'em to Buy" was for the accessory salesroom. Your community can get the opportunity of seeing this film if you will insure the exhibitors a representative group of dealers to come to the meeting. Communicate with Ray Sherman, Merchandising Director, of the A. E. A., at the above address.



## This Dealer Has Good Ideas on Service.

### PLAN 417.

We are negotiating to lease a building which the owner will build for us on a lot fronting 60 ft. on a wide main traveled street and 90 ft. deep to a 10 ft. alley. Can you help us with the general building design and the arrangement of the interior for convenience and maximum light?

Here are some of the things we have in mind:

On account of the large number of Fords in this section we will specialize on Ford repair and gradually work into service on other cars as the section builds up. We will not sell storage space. We like the idea of having the foreman in a sort of control box where he can meet incoming cars at once, keep his records and at the same time get a view of the whole shop. The office should be the only closely partitioned-off space. It should not obstruct his view. A drive-in filling station with double driveway and space for oils will be built in the southwest corner.

We will handle a few accessories and tires and would like to have them in full view of cars coming in either to the filling station or drive-in, or both. We cannot count on having any light from the east, but we want all possible daylight for the small lathe, grinder, drill press, benches and space where cars will be worked on. We will install a small motor-generator set (about 16 batteries) and a test-bench outfit, so we need some light there, too. The owner wants to build just one story and of brick and hollow tile construction. We will install the flat-rate system as far as possible and extend it as we get the data. Adequate equipment, mature, careful workmen, fair charges, guaranteed work, and courtesy at all times will put us across, I'm sure.—C. A. Drake, San Diego, Calif.

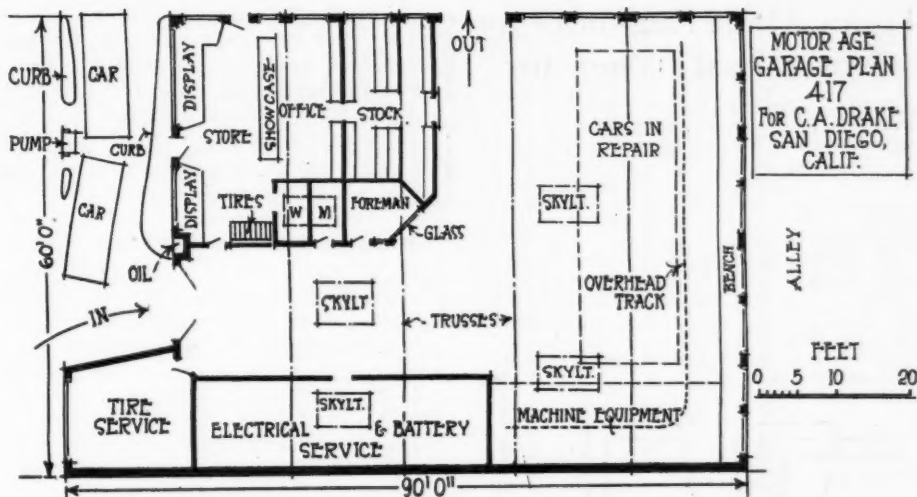
There is no harder thing to design than a corner drive-in filling station that does not use more space than one has to spare. On the whole we are inclined to think that the style shown here is preferable to most any other since it not only occupies a minimum of space but leaves the surrounding space more usable than it would be were a diagonal or circular section cut away.

By lining up the accessory store display windows across from the pump you get the full benefit of the effect they will have on the customer.

There is enough space between the pump and the end of the drive-in so that the entrance will not be obstructed by a long car at the pump.

The roof should be supported by 4 trusses of whatever type desired, the round top lattice being popular here, but in your section where good long timbers are obtainable, the Howe truss might be desirable on account of its slow burning qualities.

It is hardly necessary to partition off the repair shop here as the whole inside of the building is practically a shop and you will be able to handle more over-



In this design, there is enough space between the pump and end of drive-in so that the entrance or exit will not be obstructed by a long car at the pump. By lining up the accessory show case as shown, across from the pump, full benefit will be obtained as the customer will readily see everything on display. The suggested oil handling system is a series of faucets, enclosed in a niche or cupboard

flow business without partitions to hamper car movements.

The suggested oil handling system is a series of faucets enclosed in a niche or cupboard. The niche is inclosed by a sliding door and the oil is fed to the faucets by gravity or pressure as desired.

### FORD GENERATOR TROUBLE.

Q—We have a 1922 Ford generator that will not charge more than 10 amps. no matter where the third brush is moved. Everything in the generator seems to be in good condition but we cannot get any more than this from the machine. What is the trouble?—Mission Garage, Hermitage, Ark.

1—It is possible that the main brushes are not set on neutral. To check this the machine should be taken from the car and the third brush lifted from the commutator. A battery should be connected to the live terminal and the frame so as to run current through the armature. It should then have practically no tendency to turn. If the main brushes are off neutral the armature will turn one way or the other indicating that the main brushes are improperly set.

These can be moved by loosening the four round head screws at the outside of the end bracket which permits shifting the whole rocker ring. After a position is attained where the armature has no appreciable tendency to rotate either way these four screws can be locked and the generator can again be checked for output. If this is not the cause of the trouble you might check the field winding and see if the whole field circuit draws about two amperes when con-

nected to six volts. You might also check the brush holders, armature and field for ground, and check the armature for short circuits.

### STEAM CAR QUESTIONS.

Q—Have steam automobiles overcome the difficulty due to the use of poor water in their boilers or coils; if so how?

1—The formation of scale on the boilers and coils of steam automobiles has been overcome to a great extent by using a condenser which makes it possible to use the same water over again and we are advised that on one popular type of steam motor car, that after 20,000 miles use very little scale is noticeable on the boiler and coils.

2—How much water is consumed in this type of car per 100 miles?—W. H. Clement, Satanta, Kansas.

2—The amount of water consumed will vary with the temperature and with conditions of running, more water being used in hot weather than in cool weather. A 20-gallon supply which is usually carried is capable of operating the car for from 150 to 500 miles. The exhaust steam contains a quality of oil which would tend to prevent the accumulation of lime or other scale. In localities where the water is exceptionally poor it is recommended that the boiler be blown off frequently as an additional preventative.

### NO ADDRESS ON INQUIRY

A letter was received by the Clearing House Department of MOTOR AGE signed by Forrest Gary, 424 Branciparte Street. The city or town was not given so we are unable to answer this inquiry.

### Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how

large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

## Home Made Regulator for North East Generator

Q—We have a NorthEast motor-generator model D from a 1916 Dodge car and on this motor-generator the combination cut-out and regulator has been burned to a crisp. As a new cut-out and regulator is rather expensive we would like to know if there is some way of using a standard 12-volt cut-out such as an Auto-Lite cut-out and would also like to know what method of current control we could use to avoid as much expense as possible in putting this equipment into service again? This is the second time we have had trouble of this kind.—Tibbits Garage, DeQueen, Ark.

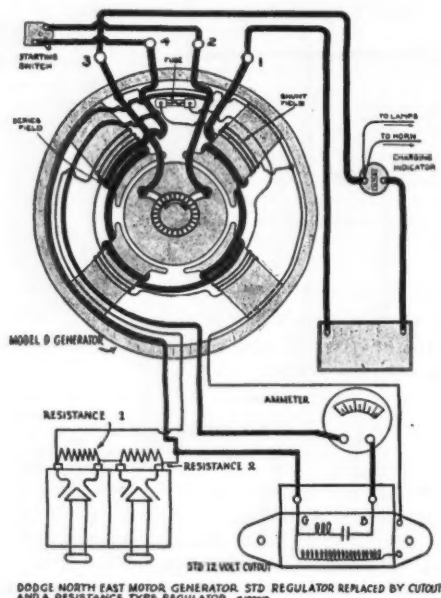


Fig. 1

In Fig. 1 is shown a diagram of model D North East motor-generator except that we have shown a homemade regulator and cut-out in place of the regulation type. At the lower right hand part of the sketch is shown a standard 12-volt cut-out, also an ammeter which is practically essential due to the fact that it will be necessary for the driver to know how much current is going to the battery in order to properly operate the regulator we have shown at the left.

In laying out this system great care should be used to put the ammeter in the circuit exactly as shown as it will not work if put in the circuit in place of the indicator. The indicator can be still left in if desired or can be removed and the two heavy cables can be bolted together. The regulator shown is made with a two gang lighting switch and two iron wire resistances made up of stove pipe wire.

In making these however some experimenting may be necessary to get the right value. One of these resistances is marked No. 1 and the other is No. 2 and the No. 1 resistance should possibly be made of three feet of wire and the No. 2 resistance of six feet of wire rolled up into a coil. If both of the switch buttons are pushed in these two resistances will be shorted out and the generator will charge the maximum current. In case the car is only run at 10 or 12 m.p.h.

this might be satisfactory, but if you should start to speed up to 20 or 25 m.p.h. you might find that the ammeter would go off the scale indicating that too much current is going to the battery.

In this case it would be necessary to pull out the No. 1 button which would throw a certain resistance into the circuit. If this is not enough the No. 1 button can be pushed in and the No. 2 button pulled out instead as this will throw twice as much resistance into the circuit and if this is not enough both buttons can be pulled out and it will throw three times the resistance of the No. 1 winding into the circuit. If this is not enough at high speed it will be necessary to re-design one or both of the resistance coils making them either longer or of smaller wire.

While the construction shown is not ideal and requires some care on the part of the driver we believe that it will be satisfactory with a careful person using it. The charging rate for a 12-volt battery should be from 5 to 10 amperes,  $7\frac{1}{2}$  being considered normal and this fact should be considered in constructing and using such equipment.

## FIGURING SIZE OF FIBER PINION FOR SPEEDOMETER DRIVE

Q—We have a Stewart speedometer which is driven from the drive shaft which has 56 teeth on its driving gear. What is the correct number of teeth for fiber pinion. The differential ratio is 12 to 55, wheels are  $34 \times 4\frac{1}{2}$  with over size cords which makes wheel diameter 35 inches.

The layout as described will require a 24-tooth pinion. The amount of teeth required in the pinion can be determined by the following equation: Twenty times

the number of teeth in drive gear times the axle ratio divided by the tire size or tire diameter in inches times the swivel joint reduction.

## Diethyl Telluride in Gasoline

2—What amount of Iodine should be used with gasoline to keep an engine from knocking?—W. W. Robbins, Punxsutawney, Pa.

2—We regret to state that we do not know the exact proportions of iodine which should be used to prevent fuel knocks in high compression engines. Little has been said about iodine recently as a compressionizer. However, according to Midgley, commercial Pennsylvania gasoline diluted with a .4 per cent of diethyl telluride produces a fuel that can be satisfactorily operated at a compression ratio as high as 7 to 1. In this respect we wish to state that this information is taken from a paper read by Midgley before the S. A. E.

## WIRING DIAGRAM OF DEACO

Q—We have a 1913 Oakland car which is in very good mechanical condition as it has not been used very much. Publish wiring diagram showing how to wire up the Deaco magneto generator which is type OX. We wish to run it without the storage battery using dry cells only and switching over to the mag. after starting.

1—A wiring diagram showing the proper connections is shown below. While this machine was called a magneto it was not really a magneto but was a generator made with permanent magnets. If an attempt is made to use this without the storage battery it will no doubt burn up. You can however, use it with a storage battery and without the dry cells starting up on the position which is called Mag. which is really today called battery ignition.

## Is Coil Needed?

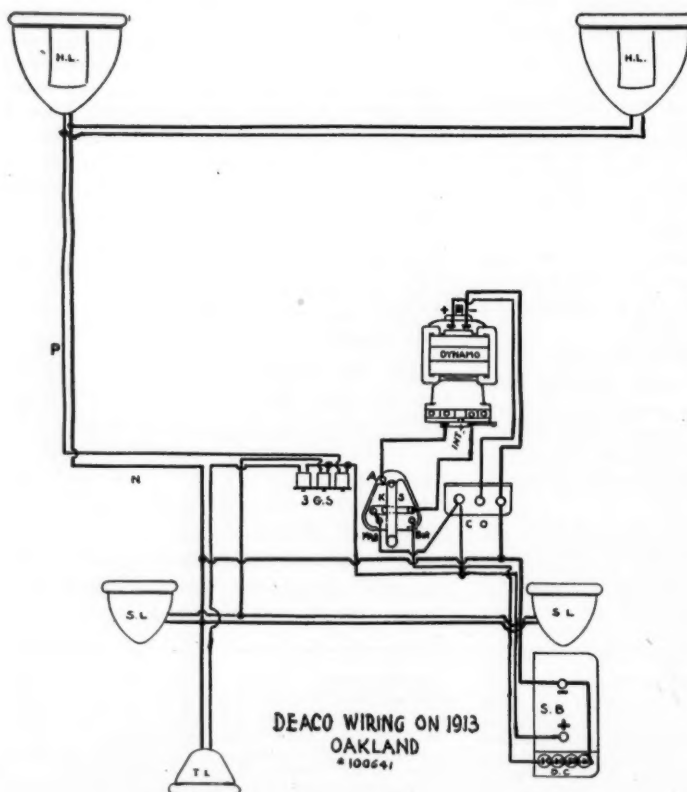
2—Does this system need a coil and if so could a Ford coil be used?

2—The Deaco ignition generator has a coil built into it just in back of the distributor so that no extra coil is needed.

## Hot Spot O. K.

3—This car has an old style Holley carburetor. Would it do any good to install a hot-spot?—Ward Ortman, Union, Ohio.

3—As this is an old type carburetor not designed with the idea of handling fuel such as used today it would no doubt be an advantage to use a hot-spot of some sort.





## Using and Testing Ignition Coils

Q—Will a 12-volt coil work with a six-volt battery, or is the resistance too great?

1—The resistance is too great and the coil will not draw enough current to give a very hot spark.

### 6 Volt Coil on 12 Volt Battery

2—Will a six-volt coil work with a 12-volt battery? Is there any danger of puncturing the secondary wiring?

2—The 6 volt coil will draw too much current from the 12 volt battery and will cause excessive flashing at the interrupter points and will cause excessive heating of the primary winding and balast. Under ordinary circumstances, the secondary winding will not be in danger of puncturing, as the voltage is limited by the setting of the spark plug gaps.

### Determining Capacity of Coil

3—How would you test to determine whether a coil is designed for use on six or 12 volts?

3—The ordinary run of ignition coils for six volt use will draw from 4 to 5 amperes when connected to a six volt battery, there being no interrupter in the circuit. Twelve volt coils, however, when connected to the same battery will only draw one or two amperes.

### Coil's Effect on Engine

4—How will the engine run if we have a 12-volt coil on a six-volt battery or a six-volt coil on a 12-volt battery?

4—With a six volt coil on a 12 volt battery the engine will run as usual, unless the coil should burn out due to the overheating. With the 12 volt coil on six volts, however, the running may be affected slightly if the spark is too weak. This will vary with the spark gap setting, however, and the exact nature of the coil.

### Safety Gap in Coil

5—Many battery ignition coils do not have any safety gap. How is the secondary winding protected in case one or more of the spark plug wires come off of the spark plugs?

5—The only protection the secondary winding has is the natural construction where the insulation is usually strong enough to withstand strains of this kind. However, it is not good practice to run for any length of time under the above circumstance. In magnetos, however, where the secondary winding has less space and it is more difficult to insulate it from the framework of the armature it will be found that a safety gap is always provided.

### Connecting Coils

6—We notice that in some coils the condenser is connected across the primary and in some instances across the breaker points. Is there any advantage in either method?

6—The best method is to connect across the breaker points and we believe you will find that most coils are connected this way. In about ten years experience we have never seen a coil connected any other way with one exception

and this was a coil used in connection with an outboard row boat motor.

### Compression Spark Test

7—We made up an ignition tester with a glass chamber mounted on a metal base and pumped 70 pounds of air into it to test spark plugs. If we get a good spark at all speeds we consider the operation O. K. What is your opinion of this test?

7—This test is very good.

### Spark Gap Test

8—Is it all right to test ignition by making it jump a 1/2-inch gap in air?

8—A 1/2 gap is too much, as 3/16 inch is about the equivalent of the average spark plug gap. The method of testing when under compression is somewhat more scientific as it imitates the conditions contained in the engine except that the gap is not heated. From a practical standpoint, however, either method is O. K.

### Factory Test of Coils

9—How do manufacturers test their ignition coils?

9—One manufacturer whose methods we are acquainted with tests ignition coils by running them with the interrupter, allowing the spark to jump a 3/16 gap across carbon or metal electrodes.

### Double Ignition System

10—What are the merits of a double ignition system and what is the advantage of having two sparks at once in the cylinder?

10—The only advantage of having two sparks at once at different places in the cylinder is due to the fact that the gas does not fire in no time but takes an appreciable fraction of a second for the flame to spread from the spark through the mixture to all parts of the cylinder. Consequently, if we fire the gas in two places separated from each other the flame does not have so far to spread and the combustion of the mixture will occur with less loss of time, consequently, giving slightly greater power.

### WESTINGHOUSE CUTOUT ON KISSEL MODEL 4-32

Q—We have a Kissel, model 4-32, equipped with Westinghouse vertical ignition and generator, which uses a combination cutout and regulator on the dash. This generator does not cut in until a speed of 18 miles per hour is reached, and when the car stops it will not cutout, ammeter showing a discharge of from 10 to 20 amperes. There seems to be an adjustment on the cutout which does not have any effect or control whatever. We have gone all over the wiring system looking for short circuits, but have found nothing wrong. Advise the cause of the trouble and how to correct it.—John Ross, Ironwood, Mich.

1—To check up the cutout part of the combination cut and regulator, it would be just as well to take a piece of bare copper wire and connect the A and F terminals on the regulator together. This will eliminate all regulation. The adjusting screw on the right hand side of the regulator should now be let alone, as it has nothing whatever to do with the operation of the cutout. You will see, however, two brass fingers or projections,

one of which goes in under the flat steel spring which tends to open the cutout points on the right hand side of the regulator. These points are hard to see, for they are in under a piece of iron which is about 1/4 by 5/8 in. cross section.

The other brass finger comes down on top of this piece of iron and regulates the height to which it can rise; in other words, regulates the opening of the cutout points. This brass finger which regulates the opening of the points should be set as to allow about 1/32 gap. From your description, the cutout both cuts in too late and out too late, entirely too late, in fact, as it does not cut out at all. This would ordinarily indicate that the spring is too weak and that the brass finger operating against the underside of the spring should be bent up so as to make the cutout open up when the engine stops.

At the same time that you make this adjustment it will make the other condition worse, and to correct this the other brass finger should be bent down so as to hold the iron armature nearer the electro magnet which operates to close the cutout points. After you have secured proper operation of the cutout and have it adjusted so that the generator cuts in charging one or two amperes and cuts out discharging not more than three or four amperes it will then be time to remove the spare copper wire connecting the A & F terminals together.

We will now pay special attention to the pair of contacts at the left side of the regulator instead of at the right. These carry current from the armature to the field and it is the pressure on these contacts which is regulated by another flat spring and the adjusting screw which is at the right side of the regulator and which you had tried to adjust to control the cutout conditions.

With these points at the left held tightly together the action will be the same as with the spare copper wire which was used in the first part of the test. However, when these points are not held together but are merely in contact due to the tension of the spring, a point will be reached where the rise in voltage and charging current will cause them to open intermittently so as to regulate the current output. It is this condition which is controlled by the adjusting screw at the right. Turning the screw right hand turns it down and increases the spring tension and, therefore, the charging rate, while turning the screw to the left decreases the spring tension and lowers the charging rate.

The charging rate should be from 12 to 15 amperes with a discharged battery, which condition can be imitated by first using the starter for a few moments to lower the battery voltage temporary then quickly starting the engine, noting the highest reading on the ammeter, which, as stated, should be from 12 to 15 amperes.

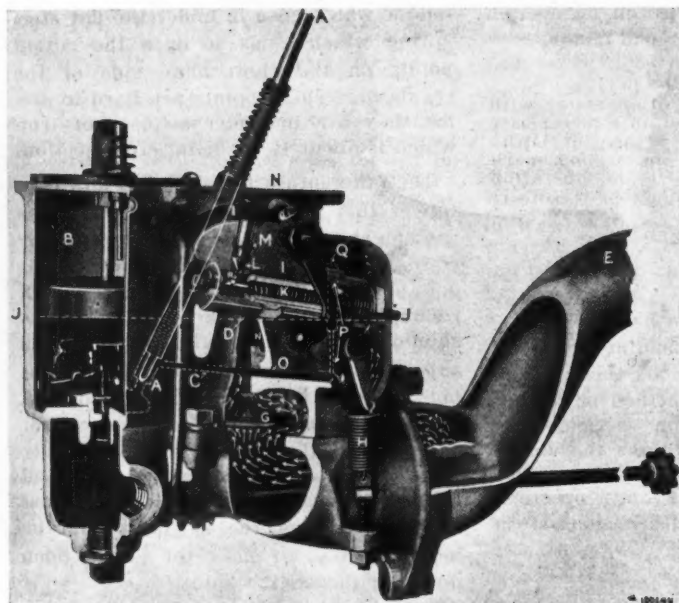


Fig. 1—Side Section of Carburetor on 9-B Franklin

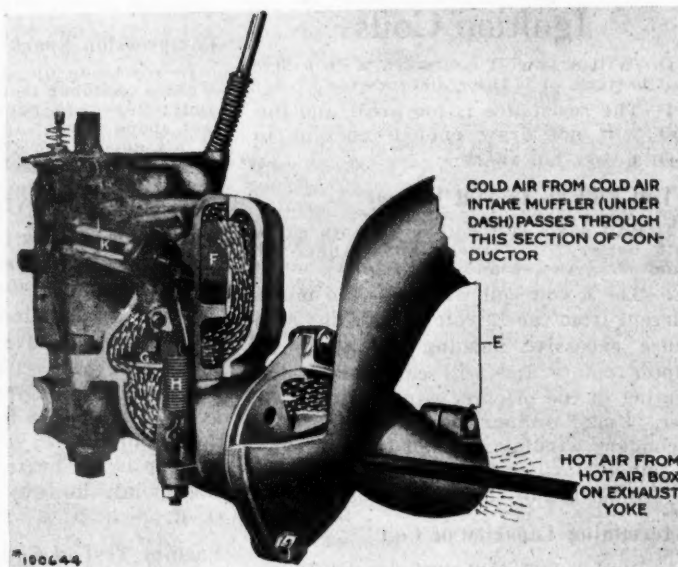


Fig. 2—End Section of Carburetor on 9-B Franklin

## Method of Adjusting Model 9-B Franklin Carburetor

Q—Give description of the carburetor used on the model 9-B Franklin.

1—The carburetor used on the 9-B Franklin car is illustrated in Fig. 1 and Fig. 2. The former showing a side section and the latter showing an end section so that air valve F can be clearly seen. Instructions for using, and explanation of the carburetor are as follows: The Franklin carburetor is controlled by two adjustments. The needle valve "AA" is regulated from the instrument board and determines the flow of gasoline from the float chamber "B" through the float chamber to the spray nozzle passage way "C" to the spray nozzle "D."

The position of the carburetor (air) lift valve "G" and the auxiliary air valve "F" is controlled by the speed of the engine and determines the passage of air through the air conductor "E" into the carburetor. (The conductor is partitioned so that there is a separate passage for hot and cold air.) The carburetor lift valve rises from its seat as soon as the engine is started, but the tension of the spring "H" makes the opening of the auxiliary air valve proportionate to the speed of the engine.

The advantage of the new type carburetor used since December 1, 1920, is that the engine can be started in cold weather without drawing cold raw gasoline into the cylinders. This improvement results from placing the vaporizer "I" above the float chamber gasoline level "J," and by so constructing the carburetor that the engine will run on a closed throttle when the vaporizer is used. In its present position the vaporizer has a distinct advantage over the old primer. The gasoline passes over the heated coil "K," whereas in the case of the primer the coil was submerged in gasoline, consequently the primer coil did not heat the fuel so effectively as does the vaporizer coil.

### How to Start the Engine

In cold weather the engine is made ready to start by turning the suction yoke heater control lever to "hot," closing the throttle (prevents raw gasoline passing from the spray nozzle into the engine), opening the needle valve a full turn and pressing the carburetor air control lever to "choke" for from 30 seconds to 1 minute (opens the vaporizer needle valve "L" and makes an electric contact which heats the coil "K"). The engine is started by continuing to hold the carburetor air control lever to "choke" and turning on the starting switch. (It should be noted that the carburetor air control lever is held to "choke" for from 30 seconds to 1 minute before the starting switch is turned to "start.")

The closed throttle prevents the passage of fuel from the spray nozzle to suction yoke passage way "N-N" into the engine, but the suction of the engine, as it is turned over by the starter, draws gasoline through the passage way "C" and "O" (under running conditions the latter is a passage way for air) through "P" and into the vaporizer. As the fuel passes along it is thinned by air sucked in at "Q," and again at "R" just before it passes the vaporizer needle valve "L" and enters into the suction yoke through the passage way "M."

The engine will fire slowly on the rich mixture from the vaporizer. After the engine has started, the throttle should be opened slowly until the engine picks up a bit (if the throttle is open too fast the engine will stall because it will be supplied with cold gasoline from the spray nozzle rather than with gasoline vapor from the vaporizer). As soon as possible the carburetor air control lever should be moved to "hot," and the needle valve opening decreased. During the warm months and in those parts of the country where the climate is mild the

year round it will not be advisable to use the vaporizer. The engine can be started by opening the needle valve a full turn and turning on the starting switch (on cool mornings and evenings it may be found advisable to use the suction yoke heater until the engine is warmed up).

As soon as possible, the needle valve opening should be decreased to approximately  $\frac{1}{2}$  or  $\frac{3}{4}$  of a turn, as the driving conditions necessitate.

### The Needle Valve Adjustment

A greater needle valve opening is required when driving at speeds above 30 m.p.h. or when hard pulling is experienced than is necessary under ordinary driving conditions. This is primarily due to an additional amount of air being drawn into the carburetor as a result of the increased speed of the engine. Gasoline from the float chamber reaches the spray nozzle through passage way "CC." As the gasoline enters the spray nozzle it is mixed with air sucked in at "Q" and "R" (mostly at "Q") and drawn to the spray nozzle through the passage ways "P" and "Q." The greater the speed of the engine the greater is the amount of air sucked in at "Q" and "R," and this circumstance makes it necessary to open the needle valve from  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn when traveling at high speeds or when hard pulling is experienced.

In effect, the carburetor has a high and low speed adjustment which is controlled by the needle valve. For average running on relatively level roads, the needle valve should be open from  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn (the same as with the old type carburetor). On heavy grades, at speeds over 30 m.p.h. and in low gear, the suction of the engine is so great that the amount of air sucked in at "Q" and "R" is increased to such an extent that the mixture is too lean to permit the



engine to operate satisfactorily (it may be sluggish or heat up). Under such conditions the needle valve should be opened another  $\frac{1}{8}$  of a turn to the  $\frac{5}{8}$  or  $\frac{3}{4}$  position. On average running the engine will load up on this adjustment. When a return is made to slower driving or easier pulling, the valve opening should be decreased.

2—Publish valve timing diagram for this same car.

2—The valve timing is accomplished by referring to the intake or suction valves only. Turn the engine over by hand until the No. 6 intake or suction valve just starts to open. Then set the gap between the No. 1 valve stem and the number 1 rocker arm which operates this valve stem to  $\frac{1}{32}$  in. Put a thin piece of paper in this  $\frac{1}{32}$  gap and turn the flywheel about one turn, stopping at exactly the instant when the thin piece of paper can be pulled out without tearing it. At exactly this point the mark DC 1 and 6 should show up at the indicator at the top of the flywheel. If the valve timing checks as above indicated it is correct. If it does not check as above described it is necessary to change the gearing at the front of the crankcase. After making sure that the valves are properly timed the clearance be-

tween the valve stems and operating arm should be set to .012 inches, this dimension being correct when the engine is cold.

3—The engine we have in mind has recently been overhauled by another concern. The cylinders were reground, we were told, but as the engine can be easily cranked either by hand or by the starter we do not feel that the pistons have been too closely fitted. We would appreciate any suggestion that can be given as to locating the trouble in this engine.—Carl J. Weinmeister, Jr., care Reeves Machine Co., Atlanta, Ga.

3—Aside from checking the valves and carbureter as indicated in questions one and two, it would be well to check the ignition. In slowly turning the engine over by hand the interrupter points should just barely open, as indicated by the breaking of the ignition circuit when the dead center marks on the flywheel are  $1\frac{1}{2}$  in. before dead center. In other words, the engine is set to fire a little bit early in starting so that with the automatic advance there will be plenty of spark advance at the running speed. With easy operation of the engine, good compression, carbureter and valves in good condition and ignition properly timed the engine should not be sluggish but should give normal satisfactory operation.

## Overhauled Ford Will Not Run On Magneto With Lights On

Q—We overhauled a Ford motor which before being worked on would not start on mag. but would start easily on battery. When the engine was taken down we found that, due to the omission of a shim behind the coil bracket, there was too much space between the magnets and the pole pieces of the coil. This was corrected and a new rear main bearing was installed so as to give proper clearance. After overhauling the engine it would start on magneto, even if the light switch was turned on, but after a few days' use it would not start on mag., although it would still start on battery, and when changed over to mag. would be O. K., throttling down and operating the lights in fair shape. What is the cause of this trouble?—Henry J. Coleman, Parkersburg, Iowa.

1—All current taken from any electrical generator has a tendency to produce a demagnetizing action and if the magnets in question had been remagnetized when the overhaul job was done it is possible that they may have lost a slight amount of magnetism and have settled down to a strength which they will be able to maintain for a long period of time. It is also possible that in some way a wire from the battery circuits may have accidentally come in contact with the magneto and if the flywheel did not happen to be in exactly the right position it might have slightly weakened the magnets.

It is also possible that the spiral contact under the magneto terminal does not make a very good connection with the coil and we would suggest your checking this to see that the tension is good and the contacts clean.

It is also possible that the vibrators on the four separate coils are a little stiff, as these are set to draw from 1.25 to 1.5 amperes as a rule. It might be

well to set these coils to draw the low limit of the current above mentioned. This adjustment is made at the U shaped spring support and not at the top of the vibrator.

The U shape spring support has two round head brass screws, one of which is a blind screw which when removed reveals another small screw which is used to open up the U shaped support so as to reduce the spring tension and permit the coil to draw less current. We would suggest your remagnetizing the magnets without removing them from the car, which can be done by the use of a compass and two 12 volt batteries or four 6 volt batteries connected in series. The regular wiring should be removed from the magneto terminal and the compass should be tested to see which end naturally points toward the north. This end is called the North Pole. The compass should then be held about two inches back of the magneto terminal and  $1\frac{1}{4}$  inches to the left of the center of the car, as considered when sitting in the driver's seat. The spark plugs should be removed and the engine turned over slowly until the compass points directly in line with the car, north pole pointing toward the radiator. The positive or plus end of the 24 volt string of batteries should now be connected to the magneto terminal and the negative end of the string of batteries should be flashed to the frame of the car some 15 times. For best results, this process can be repeated at every quarter turn of the crank, the compass being used at each quarter turn to check the exact position of the magneto on the flywheel.

## Formula for Blueing Iron and Steel Articles

Q—Publish a formula for making iron articles such as spark plugs, etc., blue like the blue finish on rifles and revolvers.—Ed. Hawn, Akron, O.

The following formula is taken from the Scientific American book of formulas. To accomplish this result without heat, first clean every part carefully and apply nitric acid one part diluted with ten parts of water until a blue film is produced on the surface. Then wash with warm water, dry and wipe with linseed oil. Where the article is of iron the following formula applies: Dissolve 140 grams of sodium hyposulphite in one litre of water, add a solution of 35 grams of lead acetate in one litre of water, and lay the perfectly bright iron objects in the liquid.

Another solution consists of potassium ferrocyanide and water one to two hundred, solution of ferric chloride one to two hundred. Mix the two solutions—last mentioned solution can be used on steel only. The following formula is recommended where a permanent coating is to be applied: Get as high a polish as possible on the part which you want to blue. Secure a box made of thin sheet iron. This box should be about 6 inches square. Pound up some wood charcoal, fill the box with this and put the box on a fire; stir up the charcoal now and again until you find it is partly ignited.

Now put the part to be blued into the box of partly ignited charcoal; put it in about midway so as to have as much heat at the bottom as at top and sides. Have handy a handful of dry powdered lime and a piece of tow or cotton waste; you will also require a small pair of tongs or other means of lifting the article out of the box. When the article is placed in the box place the box again on the fire. Careful attention must be paid to it and it must be lifted out about every ten minutes. Immediately upon lifting the article out it should be rubbed with tow dipped in the lime. As quickly as possible put back into the charcoal. Don't allow the charcoal to get too hot; when you see it getting very hot lift the box off the fire and stand it in any convenient spot; replace on fire again if necessary. The following is important: The article in a short time gets of a purple color, then bright blue. It is very tempting to leave off at this bright blue. Don't. The first blue is very little good, at least no good where the article has to be rubbed and cleaned. Continue. The bright blue will depart leaving article nearly as before you put it in the box. Don't forget every seven or ten minutes to take out the article and rub it with the tow and dry lime. It must not be kept long in the air. Presently you should obtain a rich dark blue. Finally, when blued, let it cool then oil. Any oil may be used for the rubbing process.

## AN IDEAL ELECTRICAL SERVICE STATION IN THE MAKING—No. 2

*How a Portable Meter for Temporary Use Can Be Made  
with but Little Expense*

"**P**AY as you go," said the self-made man to the college graduate. "But," was the reply, "suppose you can't pay!" "Then don't go!" was the stern answer. This same advice is wisely followed by many a shop slowly building up trade and a name for reliable service, yet too much economy is also sometimes unwise if it deprives the shop of equipment it should have in order that repairs be properly made. The right sort of equipment also impresses the customer with the shop's facilities for doing the work right, consequently brings in more business and thereby pays for itself.

In electrical work the portable meter is well-nigh indispensable, not only for the check it gives on the various electrical conditions on the car, but also for the atmosphere of dependability which it gives. Such a meter costs from about \$20 to perhaps \$50, depending on the make and the features of construction. If a shop handles only a small amount of electrical work, there may be some question as to the wisdom of making such an investment. On the other hand, without equipment, the shop will doubtless continue to do a small amount of this sort of business, for the customer is wary of the shop that has no visible means of handling the work properly.

Under these circumstances an outfit somewhat as shown in Fig. 1 will do very well until it seems advisable to get a better

be purchased for a dollar or two which will be accurate enough for most purposes.

Besides the meter, all that is needed is a lamp socket such as used on the cowl board for connecting a trouble light, and with a few feet of wire and four test clips, the bill of material is complete.

From the electrical articles that have appeared in *MOTOR AGE* from time to time various ways of using such a testing device will be evident, these methods being briefly shown in the following sketches. In Fig. 2 the ammeter side of the tester is being used to check the current supplied by the generator to the battery on a car that has no ammeter, or on a car where the accuracy of the regular meter is doubtful.

In Fig. 3 the lamp side of the tester is being used to check a

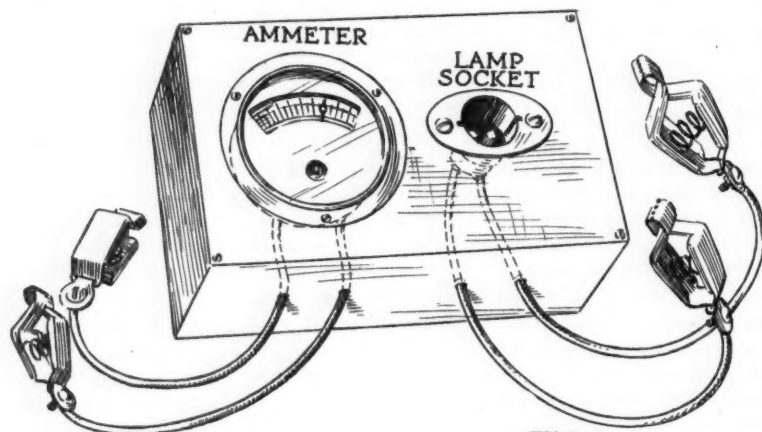


Fig. 1—Test Outfit With Ammeter and Lamp Socket

testing set. With some care this can be made not only useful but also of good appearance by making the case carefully and then staining it mahogany and giving it two or three coats of varnish. The average shop will have an old meter taken from some car which is still capable of being used, or if not one can

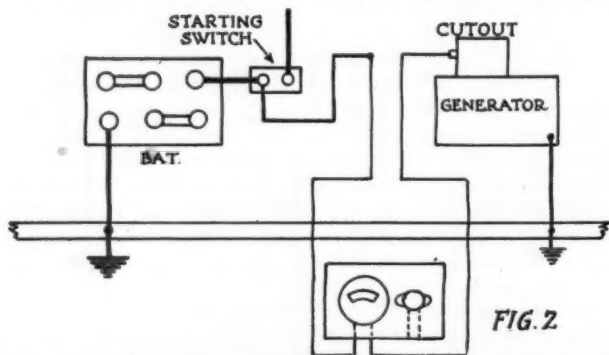


Fig. 2—Using Ammeter Side of Test Outfit to Check Generator Output

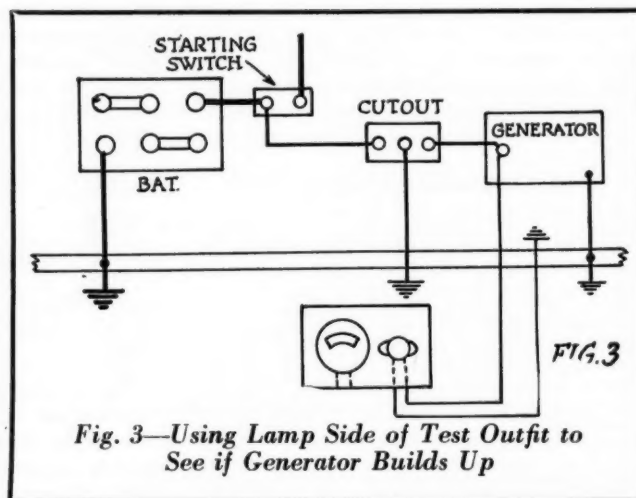


Fig. 3—Using Lamp Side of Test Outfit to See if Generator Builds Up

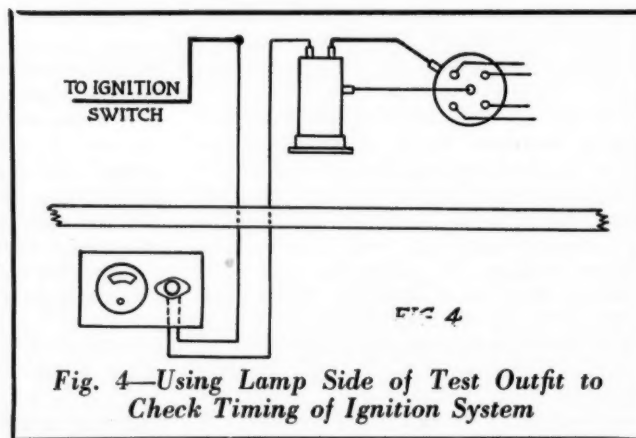
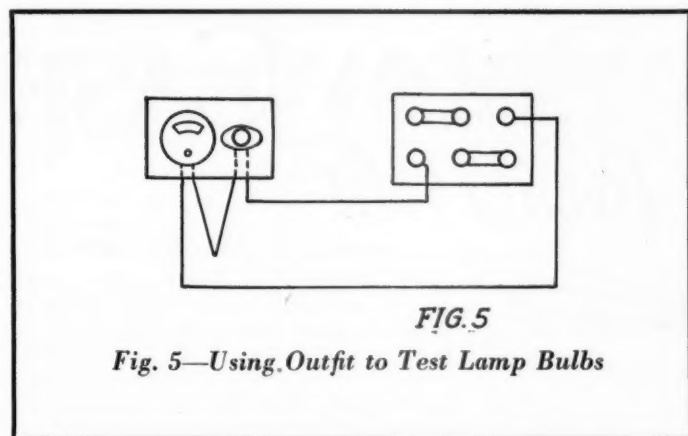


Fig. 4—Using Lamp Side of Test Outfit to Check Timing of Ignition System

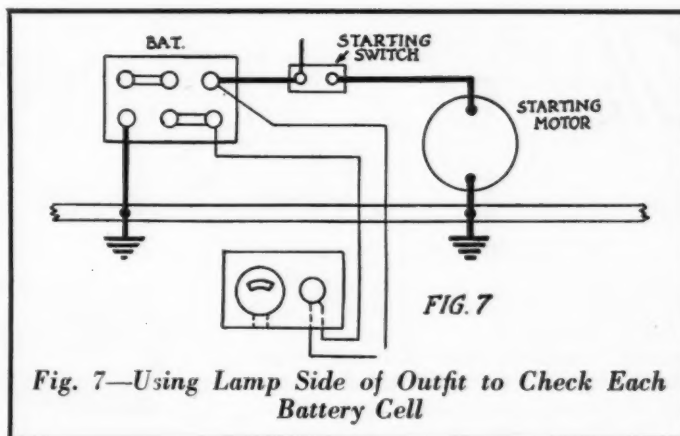
generator that does not charge to see if the trouble is really in the generator or the cutout. In making this test a bulb should be used designed for about double the normal voltage of the system. For example, on a 6-volt system a 12-volt bulb should be used. The engine should also be run at fairly low speed at first, for if the generator is working, but through some fault in the cutout is not connected to the battery, the voltage of the generator may be great enough to burn out the light. This test is one where a regular volt-ammeter would be preferable, but the lamp can be used if the test is carefully made.

In Fig. 4 the lamp is shown checking the make and break of





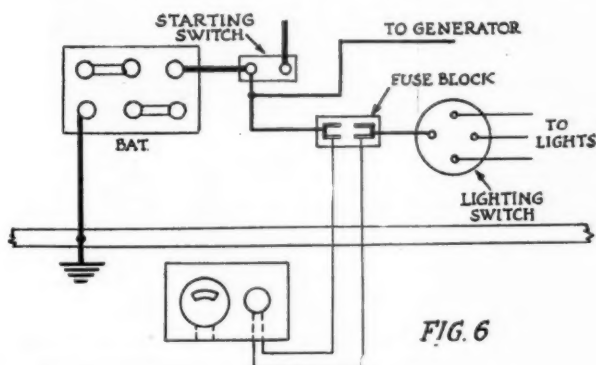
the battery ignition interrupter, and as the spark always occurs at the time the points open, the firing position will be the instant the lamp goes out. Comparing this with the piston position will make it easy to check the timing. In Fig. 5 the device is being used to check lamp bulbs before delivering them to purchaser to see that no defective ones are sold. Doing this consistently insures against bulbs being returned with the



statement that they were no good when purchased. As shown in Fig. 5, the ammeter would also register the current drawn by the bulb, which would check up variations in candle power in case the marks were not distinct.

In Fig. 6 the lamp is being used connected across the fuse clips of the lighting circuit of the car. This is done to locate a ground in the wiring after a fuse has blown and before a new one is installed. In this test all of the lamp plugs should be removed from the lamps so that normally there should be no current flowing when the switch is turned to the various positions. Lighting of the test lamp would then show trouble in the circuit, which should be corrected before a new fuse is put in.

Fig. 7 shows a test to be made on a battery to see if any one cell is dead. This requires that a 3-volt bulb be used, although a 2-volt bulb would be preferable, but may not be easy to obtain, as it is not standard on any car, as far as we are aware. The 3-volt bulb will do, however, as it will light up dimly on each cell when the starter switch is operated so that current is being taken from the battery. However, should it go out when the starter is operated, it would show a bad cell. This test is also best made with a 0-3 scale voltmeter, which the progressive shop manager will add to his equipment as the testing set demonstrates its worth and the need of having the best possible equipment is seen.



### GORDON LEE IN CALIFORNIA

SAN FRANCISCO, Cal., Aug. 1—Gordon Lee, chief of the automotive division of the Department of Commerce of the United States government, was in San Francisco in July and spoke to several hundred business men at a luncheon in the Palace Hotel, at which the Motor Car Dealers' Association, the San Francisco Automobile Trade Association, the Downtown Association, and several similar organizations were well represented. Lee spoke on foreign trade opportunities, and told of conditions in general, and in the automotive industry in particular throughout the country. He was met at San Diego by Bob Martland, secretary-manager of the California Automobile Trade Association, who arranged his California itinerary, which included Los Angeles and the Yosemite Valley.

### CONDUCTS SCHOOL FOR OWNERS

SAN FRANCISCO, Cal., July 31—William L. Hughson, president of the chain of Ford-Lincoln agencies running up and down the Pacific coast, has brought Hugh Shaw, representing the Torbett School of Motoring for Ford Owners, to San Francisco, and announced the open-

ing of a ten-weeks' session of that school, one night each week, for owners and drivers of Fords. "Ninety per cent of the repair jobs that enter our shops would be eliminated if the Ford owner had a working knowledge of the car," says Hughson, "and for this reason I have brought the school here."

### Automobile Sales Fall Off in Rail Shop Center

BLOOMINGTON, Ill., Aug. 1—Automobile dealers in this city who depend upon the railway shop employees for a considerable proportion of their business, are feeling the effects of the shopmen's strike. The Rue Motor Co. which distributes Ford cars here, sold 59 cars in the first 16 days of June. In the first 16 days of July, the total was but 20, indicating that the walkout of the railroad men was affecting business seriously.

Dealers handling the higher priced cars are not affected as much, but all admit that a number of persons have concluded to wait until the strike is settled before signing a sale contract. The shortage of cars which was acute in June

is now being relieved and many back orders are being filled. Deliveries by the railways are being handled in good shape, despite the strike.

The harvest of wheat and oats is now ended in central Illinois and the yield is reported as uniformly good in both grains while prices are ahead of last year. This means that the farmers are going to put some of this grain money into automobiles, trucks and tractors. Prospects for corn were never finer in central Illinois.

### McMILLAN GOES TO KARDEX CO.

TONAWANDA, N. Y., Aug. 1—A. G. McMillan, formerly director of sales for the Mitchell Motors Co., has been appointed director of sales of the Kardex Company, manufacturers of a visible control system of filing. Several of McMillan's associates in the Mitchell company have gone with him to his new connection. Among them are Paul C. Lott, who will be sales promotion manager, and Fred T. Yeager, who will manage the newly created automotive sales division of the Kardex company. Lott was Mitchell's sales promotion manager, and Yeager was western sales manager. All three resigned from Mitchell July 8, last.

# The ACCESSORY SHOW CASE

## New Sources of Retail Profit

### STANDARD AUTO VISOR

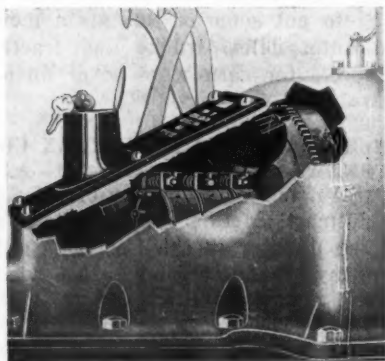
The glass of the Standard Auto Visor is of extra strength and fitted into a steel frame, padded with felt and assuring against breakage. The shade is blue and can be tilted to any angle. Price \$16.50. H. F. Wilker, Inc., 1901 Pine St., St. Louis, Mo.



### REMY LOCK FOR FORD

The Remy Transmission Lock for Fords, recently placed on the market by the Hercules Mfg Co., Indianapolis, takes the place of the regular transmission cover and prevents the motor being turned over by the electric starter, by hand or its own power. Its installation and operation do not, in any way, change the design or mechanism of the Ford, yet the lock permits the car to be moved and steered by hand in case of a fire or other emergency.

It fits snugly into the top of the Ford transmission case and is installed by screwing it on in the place of the original cover. The lock proper is encased in a hardened steel sleeve and covered by a tight-fitting snap lid. When installed, the lock lid comes just above the floor board near the brake pedal and thus is easily reached from the driver's seat. Price \$13.50.



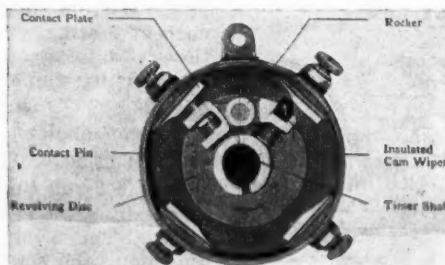
### FORD DOOR EXTENSION HANDLES

These handles are made of aluminum and extend over the door top, making opening easier. Price \$1 for set of three. H. F. Wilker, Inc., 1901 Pine St., St. Louis.



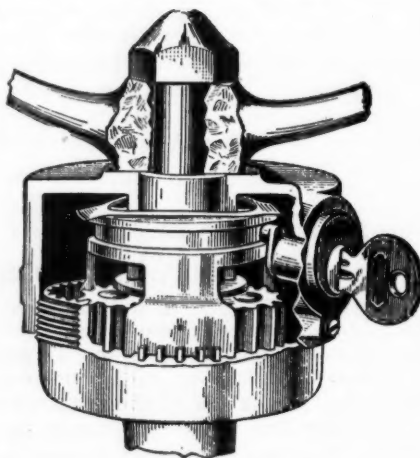
### LOWELL TIMER

The Lowell Timer is priced at \$3.95 and is made by the Lowell Equipment Mfg. Co., Lowell, Mass. The feature of its operation is that an insulated cam wiper is incorporated in the shell which revolves ahead of the contact pin, cleaning the contact plates.



### KARLOK

The Karlok is made of aluminum alloy and equipped with a Yale lock and two keys. It is fitted just below the wheel on the steering rod. The Ford size is shown in the cut. Price \$15. H. F. Wilker, Inc., 1901 Pine St., St. Louis.



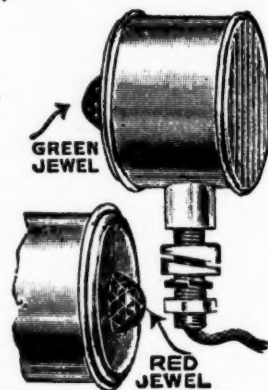
### HUGHES SPARK AND GAS LEVER EXTENSION

A Ford convenience is offered in the Hughes spark and gas lever extension, which device clamps to the regular levers, extending them to a more convenient position just under the steering wheel rim and within easiest finger reach. It sells at \$1.25. H. & H. Novelty Co., 1466 W. 28th St., Los Angeles.

### BARREL TYPE SIDE LAMP

The Barrel Type Electric Side Lamp has a corrugated slit lense, slightly frosted. Lense 2½ inches in diameter. It also has a ⅝-inch jewel in rear. One lamp with red jewel and one lamp with green jewel. The red and green jewels make it a very attractive pair of lamps. Furnished with a ⅞-inch round taper washer to allow adjustment of lamp on cowl. Six-volt, single contact bulb.

Model 795 Black and Nickel Front. Model 797 Full Nickel. Retail price, pair \$5.00. Aid Mfg. Co., 2625 Stewart Ave., Chicago.



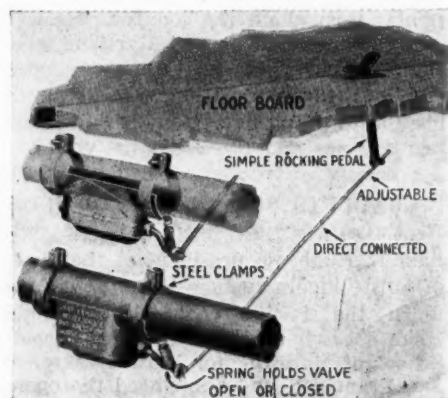
### STARLIGHT AUTO SIGNAL

The Starlight Auto Signal replaces the tail light and is attached to the brake. \$6. H. F. Wilker, Inc., 1901 Pine St., St. Louis, Mo.



### SNAP EXHAUST RELIEF VALVE

The Snap Exhaust Relief Valve enables the driver to hear every pulsation of the motor, thereby affording a means of detecting trouble. It is controlled by a foot lever, which responds upon the slightest touch. This cutout operates on the rocking pedal shown in the cut. Price \$1.50. Morse Mfg. Co., Syracuse.





# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Toronto ..... Canadian Nat'l Exhibition ..... Aug. 26-Sept. 1  
 Columbus, O. .... Columbus Auto Dealers Co. .... Aug. 28-Sept. 3  
 Decatur, Ill. .... Industrial Exhibition and Automobile Show ..... Aug. 30-Sept. 9  
 Indianapolis ..... Indianapolis Automobile Trade Assn. .... Sept. 4-9  
 Wilmington, Del. .... Delaware State Fair ..... Sept. 4-9  
 Hartford, Conn. .... Connecticut Fair Grounds ..... Sept. 4-9  
 Spokane, Wash. .... Annual Show ..... Sept. 4-9  
 Memphis ..... Memphis Automobile Dealers' Assn. .... Sept. 23-30  
 Wash'gton, City of Closed Car Salon ..... Oct. 21-23  
 Chicago ..... Annual Show of the Automotive Equipment Association ..... Nov. 13-18  
 New York ..... Annual Show ..... Jan. 6-13  
 Chicago ..... Annual Show at Coliseum  
 N. A. C. C. .... Jan. 27-Feb. 3

## CONVENTIONS

Chicago ..... Show Managers' Assn. .... Sept. 14-15

## FOREIGN SHOWS

Berlin ..... Kaiserdamm Hall ..... Sept. 25-Oct. 3  
 Rio de Janiero. .... Automotive Exhibition ..... Sept., 1922  
 London ..... International Commercial Vehicle Exhibition ..... Oct. 12-13  
 Paris, France ..... Automobile Show ..... Oct. 4-15  
 London ..... Annual Show ..... Nov. 3-11

## RACES

Colo. Spgs., Colo. .... Pike's Peak Race ..... Sept. 4  
 San Carlos, Cal. .... 500-Mile Armistice Day Race ..... Nov. 11

## New Inspection Service Makes Instant Hit

New Department Taxed to Capacity, but Being Enlarged as Rapidly as Possible



Cuts Repair Bills

TWO months ago our Service Department devised a service plan which was explained in the April issue of this bulletin. It met with the decided approval of more Ford owners than we were really able to accommodate at the time. Since then this new department has been working overtime and its capacity is being increased as rapidly as possible so that all Ford owners who wish may have the advantages of this new service.

For the benefit of those who may not be entirely conversant with the details of the plan we will explain it again.

Once a week, or twice a month, or once a month (which ever plan you prefer) one of our Service Men will call for your Ford at a definite time previously arranged for, and bring the machine to our Station. Then your car is given this attention:

1. The spark plugs are cleaned and adjusted.
2. The Commutator is cleaned.
3. The Coils are adjusted.
4. The Carburetor is adjusted.
5. The battery is tested and refilled if necessary.
6. The front wheels are lined up.
7. The Transmission Bands are adjusted.
8. The car is oiled and greased throughout.
9. The Springs are graphited.
10. The Crankcase of the Motor is washed out and the oil changed.
11. Loose bolts are tightened.
12. The headlights are properly focused.
13. The tires are inflated to the proper pressure and examined for cuts, etc.
14. The radiation System is flushed.
15. The Car is WASHED.
16. A written report is made of the condition of the machine.

WE DELIVER YOUR CAR TO YOU SPICK AND SPAN WITH A CLEAN BILL OF HEALTH.

A reasonable charge is made to cover the cost of these periodical tonics for your Ford.

If you want to ask questions about this new plan, or want more details—phone 1788—ask for the Service Department.

## Makes the Traffic Cop Easy to See



It has been the misfortune of almost all car owners to fail to see the traffic officer on the corner at night and run past him, only to be halted and given a thorough "bawling out"—which a cop can do to perfection. The fact that the traffic officer blended in with his surroundings in the dim light didn't serve to mollify his attitude. Dealers interested in relieving the traffic problem and the sales resistance that grows out of it will see in the above something worth while advocating as part of their traffic regulations. (Picture courtesy of the National X-Ray Reflector Co., Chicago.)

## HEAVY STUTZ SHIPMENTS

INDIANAPOLIS, Ind., July 31—Shipments by the Stutz Car Co. of America, Inc., for the first six months of 1922 totaled within 30 per cent of the shipments for all of last year, according to Fred E. Wilson, sales manager of the company.

## A Periodical Inspection Plan That Keeps the Shop Busy

The above notice was clipped from the customer's paper published by the F. B. Connelly Co., of Billings, Mont. Perhaps business was a bit dull with this company when this plan was devised. It was a direct appeal to the Ford owners in their territory for better and more economical transportation and it brought business to the Connelly Co. What are you doing to increase your business? The beauty of this "punch" is that it is an all year 'round proposition and it is certain to give the Connelly Co. a line on cars that should be overhauled next winter when the dull season comes.

# LAMP BULBS and FUSE DATA for 1922 PASSENGER CARS

The Candle Power of the Headlamps vary according to the laws of the particular State in which the car is operated and the type of lens used.

MAKE AND MODEL	MAKE OF LENS	DIA. OF HEADLIGHT LENS	BULBS										FUSES				Are Dash and Tail Lamps in Series?
			Head Lights		Side Lights		Tail Light		Dash Light		Tonneau Light		HEADLIGHTS	OTHER LIGHTS	HORN	GENERATOR	
			BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE					
Ace, F.	Liberty	9 1/4	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8					no
Ace, L.	Liberty	9 1/4	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8					no
Ambassador, R.	B. & Lomb.	12	S	6-8			S	6-8	S	6-8			15	15	15	30	no
American, C.	Luide	9	S	6-8	S	6-8	S	6-8	D	6-8			20*	20*	20*	20*	no
Anderson, 40.		8 3/4	S	6-8	D	6-8	S	6-8	S	6-8	D	6-8	#	#	#	#	no
Apperson, 8.	Legalite 3.	9 3/8	S	6-8			S	6-8	D	6-8	D	6-8	10				no
Auburn, 6-51.		9 7/16	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8	#	#	#	#	
Bell, 4-32.	Macbeth		S	6-8			S	6-8	S	6-8							no
Bell, 6-50.			S	6-8			S	6-8	S	6-8							no
Biddle, B1 & B5.		9 3/8	D	6-8			D	6-8	D	6-8			10*	10*	10*	10*	no
Brewster, 02.		9 1/4	S	12-16	S	12-16	D	6-8	D	6-8	D	6-8	10	10	10	30	yes
Buick, Six.	Osgood.	8 1/2	S	6-8			S	6-8			S	6-8					no
Buick, Four.	National.	8 5/8	S	6-8	S		S	6-8	S	6-8							no
Cadillac, 61.	B. & Lomb.	9 1/4	S	6-8	S	6-8	S	3-4	S	3-4	S	6-8	%	%	%	%	yes
Case, X.	Warner	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8						5	no
Chalmers, 35C.			S	6-8	S	6-8	S	6-8	S	6-8							no
Chandler, 1922.		8 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	20	20	20	5	no
Chevrolet, 490.	National.	8 1/8	S	6-8			S	6-8					20*	20*	20*	20*	no
Chevrolet, FB.			S	6-8			S	6-8	S	6-8							no
Cleveland, 41.		8 5/8	S	6-8	S	6-8d	S	6-8	S	6-8	D	6-8	20	20	20	5	no
Cole, 870.	Liberty	9 1/2	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8	#	#	#	#	no
Columbia, L6.	McKee			6-8													
Comet.	Brown	9	S	6-8	S	6-8	D	3-4	D	3-4							yes
Cunningham, V-4.	Conaphore.	11	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	#	#	#	#	no
Daniels, D19.	Liberty	9 3/8	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8	#	#	#		no
Davis, 71.																	
Dixie Flyer.	Macbeth	7 5/8	D	6-8	D	6-8	D	3-4	D	3-4	D	6-8	10	10	10		yes
Dodge Brothers.		8 3/4	S	12-16			S	6-8	S	6-8							yes
Dorris, 6-80.	Warner	9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	15	15	15	15	no
Dort, 19.		9	S	6-8			S	3-4	S	3-4			10	10	10		yes
Driggs.				6-8													
Duesenberg.		9	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8					no
DuPont, A.	Paterson.			12-16													
Durant, A-22.	National.	9	S	6-8			S	6-8	D	6-8	D	6-8	20	20			no
Durant, B-22.	Monogram.	8 1/2	S	6-8			S	6-8	D	6-8	S	6-8	20	20			no
Earl, 40.	Macbeth	8 3/4	S	6-8	S	6-8	S	6-8	D	6-8	D	6-8	20	20		b20	no
Elcar, K4.	Warner	9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8					no
Elcar, 7R.	Warner	9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8					no
Elgin, K-1.		9 11/16	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	20	20		5	no
Essex.	Paterson.	8 5/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10	5	no
Ford, T.	Own.	8 1/8	D	6-8			S	6-8					#	#	#	#	no
Franklin, 9B.	Legalite.	9	D	12-16	D	12-16	D	6-8	D	6-8	D	12-16	10	10	10		yes
Gardner.	Warner	8 5/8	S	6-8	S	6-8	S	6-8	S	6-8			20	20		5	no
Grant.	Liberty	8 5/8	D	6-8	S	6-8	S	6-8	S	6-8			15	15	15	10	no
Halladay, Six.			S	6-8	S	6-8	D	3-4	D	3-4	S	6-8					yes
Hatfield, A-42.	Saferlite	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8							no
Hanson, 60.		10 3/4	S	6-8			S	3-4	D	3-4	D	6-8	#	#	#		yes
Handley-Knight.		9 1/4	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	20	20	20	20	no
Haynes, 55.		8 7/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8				5	no
Haynes, 75.		8 7/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8				5	no
Holmes, 4.	Conaphore.	9 1/4	S	12-16	S	12-16d	S	12-16	S	12-16	S	12-16	10	10		10	no
Hudson, S6.	Paterson.	9 1/6	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10	5	no
Hupmobile, R.	Liberty	8 1/8	S	6-8			S	6-8	S	6-8			10	10	10	5	no
H. C. S.			S	6-8	S	6-8	D	6-8	D	6-8							no
Jewett.	Monogram	8 1/8	S	6-8	S	6-8d	S	3-4	S	3-4			20	20	20b	5	yes
Jackson, 6-38.		8 7/8	S	6-8	S	6-8	S	6-8	D	3-4	D	3-4	20	20			yes
Jordan, MX.	Paterson.	8 3/4	S	6-8			S	6-8	S	6-8	S	6-8					no
King, 8.	Paterson.	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10	5	no
Kissel.	Legalite.	8	S	6-8	D	6-8	S	6-8	D	6-8	D	6-8	20	20	20		no
Kline, 6-55-K.	Paterson.	8 3/4	S	6-8			S	6-8	D	6-8			15	5	10		no
LaFayette, 134.		9 1/8	S	6-8	S	6-8	S	3-4	S	3-4	S	6-8	#	#	#	#	yes
Leach, 999.		8 3/4	S	6-8	S	6-8d	S	6-8	S	6-8	D	6-8	10	10	20		no
Lexington, ST22.	Two Ways.	8 1/8	S	6-8	D	6-8	S	6-8	D	6-8			15	15	15	5	no
Lexington, T22.	Two Way.	8 1/8	S	6-8	D	6-8	S	6-8	D	6-8			15	15	15	5	no

B. & Lomb—Bausch & Lomb.  
 \*—one fuse for all.  
 #—no fuse used.

%—Circuit breaker.  
 d—Dimmer.  
 b—Ignition.

c—Side and Tail Lights in series.  
 D—Double contact.  
 S—Single contact.



# LAMP BULBS and FUSE DATA for 1922 PASSENGER CARS

The Candle Power of the Headlamps vary according to the laws of the particular State in which the car is operated and the type of lens used.

MAKE AND MODEL	MAKE OF LENS	DIA. OF HEADLIGHT LENS	BULBS										FUSES				Are Dash and Tail Lamps in Series?
			Head Lights		Side Lights		Tail Light		Dash Light		Tonneau Light		HEADLIGHTS	OTHER LIGHTS	HORN	GENERATOR	
			BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE	BASE	VOLTAGE					
Liberty		8 1/8	S	6-8	S	6-8	S	3-4	S	3-4	S	3-4		5			yes
Lincoln				6-8		6-8		3-4		3-4		3-4					yes
Locomobile, 48	Legalite	8 3/4	D	6-8	D	6-8	D	6-8	D	6-8	D	6-8	10	10	10		no
Maibohm, B	National	8 3/4	S	6-8	S	6-8	S	3-4	S	3-4	S	3-4			6		yes
Marmon, 34	Warner	9 7/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	#	#	#	#	no
Maxwell	Corcoran		S	6-8	S	6-8	S	6-8	S	6-8							no
Mercer	Gray-Davis	9 1/4	S	6-8	S	6-8d	S	6-8	S	6-8	D	6-8	30	30		5	no
Merit	Parabolite	9	S	6-8	S	6-8d	S	3-4	S	3-4	D	6-8					yes
McFarlan, TV	B. & Lomb	9	S	6-8	D	3-4	S	3-4	D	6-8		6-8					yes
Mitchell, F-50	Paterson	8	S	6-8	D	6-8	S	6-8	S	6-8	D	6-8	10	10			no
Monroe		8 3/4	S	6-8	S	6-8	S	6-8	D	6-8		6-8	20	20			no
Moon, 6-40	Monogram	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8		6-8					no
Moon, 6-48	Paterson	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8		6-8					no
Nash, Six	Warner	8 3/4	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	#	#	#	#	no
Nash, Four																	
National, BB	Liberty	9 1/4	S	6-8	S	6-8	S	6-8	D	6-8	S	6-8				5	no
Noma, 1C	Warner		S	6-8			S	6-8	S	6-8		6-8					no
Norwalk, 430-KS	Legalite	8 5/8	S	6-8			S	3-4	S	3-4		6-8	#	#	#	#	yes
Oakland, 6-44	National	8 5/8	S	6-8			S	6-8	S	6-8	D	6-8					no
Ogren, Six	Paterson	10 1/4	S	6-8			S	6-8	D	6-8	D	6-8	15*	15*	15*	15*	no
Oldsmobile, 43A	National	8 5/8	S	6-8	S	6-8d	S	6-8	D	6-8		6-8					no
Oldsmobile, 46	Paterson	8 5/8	S	6-8	S	6-8	S	6-8	D	6-8		6-8					no
Oldsmobile, 47	Paterson	7 15/16	S	6-8	S	6-8	S	6-8	D	6-8		6-8					no
Overland, 4	Monogram	8 1/4	S	6-8			S	3-4	S	3-4	S	6-8	20	20	20		yes
Packard, Twin 6	Liberty	8 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10		no
Packard, S 6	Warner	8 1/2	S	6-8	S	6-8d	S	6-8	S	6-8	S	6-8	#	#	#	#	no
Paige, 6-66	Warner	8 7/8	S	6-8	S	6-8	S	3-4	D	3-4	D	6-8	20	20	20b	5	yes
Paige, 6-44	Warner	9 3/8	S	6-8	S	6-8	S	3-4	D	3-4	S	6-8	20	20	20b	5	yes
Paterson	Paterson	8 1/2	S	6-8	S	6-8	S	3-4	D	3-4	D	6-8					yes
Peerless	Liberty	9 3/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10		no
Pierce-Arrow	B. & Lomb		S	6-8			S	6-8	S	6-8		6-8					
Pilot, 6-50	Paterson	8 3/4	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	#	#	#	#	no
Premier, 6-D	Liberty		S	6-8	D	6-8	D	6-8	S	6-8	D	6-8	#	#	#	#	no
R. & V. Knight, R	Paterson	9 5/8	S	6-8			S	6-8	D	6-8	D	6-8	20	20		20b	no
R. & V. Knight, J	Paterson	9 5/8	S	6-8			S	6-8	D	6-8	D	6-8	20	20		20b	no
Reo, T6		9 3/4	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	5*	5*	5*	5*	no
Revere, C	Gray & Davis		D	6-8	S	6-8	S	6-8	D	6-8	D	6-8					no
Rickenbacker		9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	20	20	20		no
Roamer, 6-54-E		8 7/8	S	6-8	S	6-8d	S	3-4	S	3-4	S	6-8	10*	10*	10*	10*	yes
Roamer, 4-75-E		8 7/8	S	6-8	S	6-8d	S	3-4	S	3-4	S	3-4	15*	15*	15*	15*	yes
Rolls-Royce	B. & Lomb	11	D	12-16	D	12-16	D	12-16	D	12-16	D	12-16	10	5	5b	5	no
Saxon, 125G	Zorger	8 3/4	S	6-8	S	6-8	S	6-8	S	6-8		6-8	15	15	15		no
Sayers, DP	Warner	8 3/4	S	6-8	S	6-8	S	3-4	D	3-4	D	6-8					yes
Seneca, L2 & O2		8 1/2	S	6-8			S	6-8	D	6-8		6-8					no
Standard, 8	Liberty	8 7/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	%	%	%	%	no
Stanley	Liberty	9 3/8	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	15*	15*	15*		no
Stanwood, A-22	Paterson	9 1/4	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	10	10	10	10	no
Stearns-Knight	National	9 1/4	S	12-16	S	12-16d	S	12-16	S	12-16	S	12-16	20	20	20		no
Stephens, 90	Warner	9 3/4	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	20	20			no
Stevens-Duryea	Mattisse		S	6-8	S	6-8	S	6-8	S	6-8	S	6-8					no
Studebaker, L6		8 1/2	S	6-8	S	6-8	S	6-8	S	6-8		6-8	10	10	10		no
Studebaker, S6		9	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10	10	no
Studebaker, B6		9	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	10	10	10	10	no
Stutz	Paterson	9 1/2	S	6-8	S	6-8d	D	6-8	D	6-8		6-8					no
Templar, 445	Liberty	9 3/8	S	6-8	S	6-8	S	6-8	D	6-8		6-8	20*	20*	20*	20*	no
Vellie, 58	Warner	9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	10	10	10		no
Vellie, 34	Warner	9 1/2	S	6-8	S	6-8	S	6-8	S	6-8	D	6-8	10	10	10		no
Westcott, C-48	Paterson	8 3/4	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	%	%	%	%	no
Westcott, A-44	Paterson	8 3/4	S	6-8	S	6-8	S	6-8	S	6-8	S	6-8	%	%	%	%	no
Wills St. Claire	Own		S	6-8							S	6-8					
Willys-Knight	Monogram	8 1/2	S	6-8	S	6-8	S	3-4	S	3-4	S	6-8	20	20	20		yes
Winton			S	6-8	S	6-8	S	6-8	S	6-8	S	6-8					no

B. & L.—Bausch & Lomb.  
 \*—one fuse for all.  
 #—no fuse used.

%—Circuit breaker.  
 d—Dimmer.  
 b—Ignition.

c—Side and Tail Lights in series.  
 D—Double contact.  
 S—Single contact.





# PISTON RING SIZES FOR 1922 PASSENGER CARS

**Motor Age Maintenance Sheet No. 180**

[illegible]

## Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason.....	1 1/2	\$1050a	3 1/2 x 5	34x5n	34x5n	W	Corbitt.....D-22	1 1/2	\$2200	3 1/2 x 5	34x3 1/2	34x5	W	Gerais.....K	2 1/2	\$3500	4 1/2 x 5 1/2	30x4	30x8	W
Acason.....RB	1 1/2	1950	3 1/2 x 5 1/2	30x3 1/2	30x6	W	Corbitt.....C-22	2	2600	4 1/2 x 5 1/2	30x3 1/2	30x7	W	Gerais.....O	3 1/2	4500	4 1/2 x 5 1/2	30x5	40x12	W
Acason.....H	2 1/2	2750	4 1/2 x 5 1/2	30x4k	30x8k	W	Corbitt.....B-22	2 1/2	3000	4 1/2 x 5 1/2	30x4	30x7	W	Graham Bros.....	1	1265	3 1/2 x 4 1/2	33x4 1/2	34x5n	B
Acason.....L	3 1/2	3450	4 1/2 x 5 1/2	30x5k	30x10k	W	Corbitt.....R-22	3	3200	4 1/2 x 5 1/2	30x4	30x8	W	Graham Bros.....	1 1/2	1325	3 1/2 x 4 1/2	33x4 1/2	30x6n	B
Acason.....M	5	4350	5 x 6 1/2	30x6	40x12	W	Corbitt.....A-22	3 1/2-4	3800	4 1/2 x 5 1/2	30x5	30x10	W	*Gramm-Pion.....10	1	1245	3 1/2 x 5	33x5n	33x5n	B
Acme.....C	1 1/2	2205	3 1/2 x 5 1/2	34x3 1/2	34x5k	W	Corbitt.....AA-22	5	4500	4 1/2 x 6	30x6	40x6d	W	*Gramm-Pion.....15	1 1/2	1750a	3 1/2 x 5	30x3 1/2	30x5k	I
Acme.....A	2 1/2	2795	4 1/2 x 5 1/2	30x4k	30x7	W								*Gramm-Pion.....65	1 1/2	2250a	3 1/2 x 5	30x3 1/2	30x5	W
Acme.....20	1		3 1/2 x 5	35x5n	35x5n	W	Day-Elder.....AS	1	1600	3 1/2 x 5	35x5n	35x5n	W	*Gramm-Pion.....20	2	2475a	4 1/2 x 5 1/2	30x4k	30x7k	W
Acme.....30	1 1/2		3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder.....B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	*Gramm-Pion.....30	3	3300a	4 1/2 x 5 1/2	30x4k	30x4dk	W
Acme.....40	2		3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder.....D	2	2400	4 1/2 x 5 1/2	30x4	30x7	W	*Gramm-Pion.75P	3 1/2	4225a	4 1/2 x 5 1/2	30x6n	42x9n	W
Acme.....60	3		4 1/2 x 5 1/2	30x4	30x7	W	Day-Elder.....C	2 1/2	2750	4 1/2 x 5 1/2	30x4	30x7	W	*Gramm-Pion.....40	4	3850a	4 1/2 x 5 1/2	30x5	30x5dk	W
Acme.....60L	3		4 1/2 x 5 1/2	30x4	30x7k	W	Day-Elder.....E	3 1/2	3150	4 1/2 x 5 1/2	30x5	30x5d	W	*Gramm-Pion.....50	5-6	4450a	4 1/2 x 6	30x6	40x6k	W
Acme.....90	4 1/2		4 1/2 x 5 1/2	30x5	40x10	W	Dearborn.....E	5	4250	4 1/2 x 6	30x5k	40x6dk	W	Hahn.....B2	1	1750	3 1/2 x 5	34x5k	34x5k	W
Acme.....125	6 1/2		4 1/2 x 6	30x6	40x12	W	Dearborn.....FX	1	1000	3 1/2 x 5	35x5n	35x5n	W	Hahn.....O	1 1/2	2150	3 1/2 x 5 1/2	30x3 1/2	30x6k	W
American.....25	2 1/2	3350	4 x 6	30x4k	30x4dk	W	Dearborn.....F	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Hahn.....K	2	2550	4 1/2 x 5 1/2	30x7k	30x8k	W
American.....40	4	4275	4 1/2 x 6	30x5k	30x5dk	W	Dearborn.....48	2	2180	3 1/2 x 5 1/2	34x4	34x5	W	Hahn.....L	3	3250	4 1/2 x 5 1/2	30x5k	30x8k	W
Armleder.....20	1		3 1/2 x 5 1/2	34x3 1/2	34x6k	W	Defiance.....G	1	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W	Hahn.....M	5	3850	4 1/2 x 5 1/2	30x5	30x10	W
Armleder.....43-B	1 1/2		4 1/2 x 5 1/2	34x3 1/2	34x6k	W	Defiance.....D	1 1/2	1095a	3 1/2 x 5	35x5n	35x5n	B	Hahn.....N	6	4650	4 1/2 x 6	30x6	40x12	W
Armleder.....43-C	1 1/2		4 1/2 x 5 1/2	34x3 1/2	34x6k	W	Defiance.....E	2	2095a	3 1/2 x 5	35x5n	30x6n	I	Hal-Fur.....E	1 1/2	2350	4 1/2 x 5 1/2	34x5n	38x7n	W
Armleder.....HW-B	2 1/2		4 1/2 x 5 1/2	30x4k	30x7k	W	Defiance.....F	2	2275a	3 1/2 x 5	35x5n	38x7n	I	Hal-Fur.....F	2 1/2	3000	4 1/2 x 5 1/2	30x6n	36x8	W
Armleder.....HW-C	2 1/2		4 1/2 x 5 1/2	30x4k	30x7k	W	Denby.....31	1 1/2	1485	3 1/2 x 5	35x5n	35x5n	B	Hal-Fur.....F	3 1/2	4000	4 1/2 x 5 1/2	30x6n	40x10	W
Armleder.....KW-B	3 1/2		4 1/2 x 5 1/2	30x5k	30x5dk	W	Denby.....33	1 1/2	2145	3 1/2 x 5	35x5n	38x7n	I	Hall.....1	1 1/2	3100	3 1/2 x 5	34x5n	38x7n	W
Armleder.....KW-C	3 1/2		4 1/2 x 5 1/2	30x5k	30x5dk	W	Denby.....34	2	2395	3 1/2 x 5	30x3 1/2	30x6	I	Hall.....2	2 1/2	3275	4 1/2 x 5 1/2	30x4	30x6	W
Atlas.....MD	1	1185	3 1/2 x 5	32x4 1/2	32x4 1/2	W	Denby.....35	2 1/2-3	2795	3 1/2 x 5 1/2	30x4	30x7	I	Hall.....3	3 1/2	4100	4 1/2 x 5 1/2	30x5	30x5d	W
Atterbury.....20R	1 1/2	2475	3 1/2 x 5	31x3 1/2	31x5	W	Dependable.....A	3 1/2-4	3895	1 1/2 x 5 1/2	30x5	30x5d	I	Hall.....4	5	5100	4 1/2 x 5 1/2	30x5	40x6d	W
Atterbury.....7CX	2 1/2	3175	4 1/2 x 5 1/2	30x4	30x4d	W	Dependable.....C	2	4295	1 1/2 x 5 1/2	30x6	40x6d	I	Hall.....7 chain	7	5100	4 1/2 x 5 1/2	30x5	40x6d	W
Atterbury.....22C	2 1/2	3375	4 1/2 x 5 1/2	30x4	30x4d	W	Dependable.....D	2 1/2	1650	3 1/2 x 5 1/2	34x5n	30x6n	W	Harvey.....WOA	2	2650	4 1/2 x 5 1/2	34x4	34x7	W
Atterbury.....7D	3 1/2	3975	4 1/2 x 5 1/2	30x5	40x5d	W	Dependable.....E	3	2350	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Harvey.....WFA	2 1/2	2950	4 1/2 x 5 1/2	30x4	30x7	W
Atterbury.....22J	3 1/2	4275	4 1/2 x 5 1/2	30x5	40x5d	W	Dependable.....F	2 1/2	2050	4 x 5 1/2	34x5	30x6	W	Harvey.....WHA	3	3950	4 1/2 x 6	30x5	30x5d	I
Atterbury.....8E	5	4975	4 1/2 x 6	30x5	40x6d	W	Dependable.....G	3	2050	4 x 5 1/2	30x4	30x7	W	Hawkeye.....K	1 1/2	1850	3 1/2 x 5 1/2	30x5	34x5k	I
Autocar.....21UF	1 1/2-2	1950	3 1/2 x 5 1/2	31x1k	31x5k	D	Diamond T.....O-3	1-1 1/2	1075	3 1/2 x 5 1/2	30x3 1/2	30x4n	W	Hawkeye.....M	2	2650	4 1/2 x 5	30x4k	30x6k	I
Autocar.....21UG	1 1/2-2	2050	3 1/2 x 5 1/2	31x1k	31x5k	D	Diamond T.....T	1 1/2	2250	3 1/2 x 5 1/2	30x3 1/2	30x5	W	Hawkeye.....N	3 1/2	3700	4 1/2 x 5 1/2	30x5k	30x10k	I
Autocar.....27H	2	2950	4 x 5 1/2	31x5	30x7	D	Diamond T.....U	2-2 1/2	2650	4 x 5 1/2	30x4	30x7	W	Hendrickson.....O	1 1/2	2200	3 1/2 x 5 1/2	30x4n	30x5n	W
Autocar.....27K2	2	3075	4 x 5 1/2	31x5	30x7k	D	Diamond T.....K	3 1/2	3750	4 1/2 x 5 1/2	30x5	30x5d	W	Hendrickson.....N	2	2690	4 1/2 x 5 1/2	30x4k	30x7k	W
Autocar.....26V	5	3350	4 1/2 x 5 1/2	31x6	30x12	D	Diamond T.....EL	5	4325	4 1/2 x 5 1/2	30x6	40x6d	W	Hendrickson.....M	3 1/2	3000	4 1/2 x 5	30x5k	30x5d	W
Autocar.....26-B	5	4190	4 1/2 x 5 1/2	31x6	30x12	D	Diamond T.....S	5	4500	4 1/2 x 6	30x6	40x6d	W	Hendrickson.....K	5	4000	5 x 6 1/2	30x6	40x6	W
Available.....H1 1/2	1 1/2	2475	4 x 5	30x3 1/2	30x5k	W	*Diehl.....A	1 1/2		3 1/2 x 5	30x4 1/2	30x5	I	Huffman.....B	1 1/2-2	1795	3 1/2 x 5 1/2	34x3 1/2	34x6	W
Available.....H2	2	2775	4 x 5	30x3 1/2	30x5k	W	*Diehl.....D	1 1/2		3 1/2 x 5	30x6	30x6	I	Huffman.....C	1 1/2-2	1695	3 1/2 x 5 1/2	30x4 1/2	30x6	I
Available.....H2 1/2	2 1/2	3160	4 x 5	30x3 1/2	30x5k	W	Doane.....2 1/2		4100b	4 1/2 x 5 1/2	30x5	30x7	C	Huffman.....D	2-3	2895	4 1/2 x 5 1/2	30x4	30x7	W
Available.....H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	30x5	40x5d	W	Doane.....3 1/2		5100b	4 1/2 x 5 1/2	30x5	30x5d	C	Hurlburt.....A	1 1/2	2850	4 x 5 1/2	34x4	34x5	W
Available.....H5	5	5375	5 x 6	30x6	40x12	W	Doane.....0		6000b	5 x 6 1/2	30x6	40x6d	C	Hurlburt.....B	2 1/2	3750	4 1/2 x 5 1/2	30x4	30x4d	W
*Avery.....1			3 x 1 1/2	31x5n	34x5n	I	*Dodge Brothers.....	3 1/2	730	3 1/2 x 5 1/2	32x4n	32x4n	B	Hurlburt.....C	3 1/2	4500	4 1/2 x 6	30x5	30x5d	W
							Dorris.....K-4	2-2 1/2	3400	4 1/2 x 5 1/2	30x4	30x7	W	Hurlburt.....D	5	5500	4 1/2 x 6	30x5	40x6d	W
							Dorris.....K-7	3 1/2	4400	4 1/2 x 5 1/2	30x5	36x10	W							
							*Dort.....103	3 1/2	685a	3 1/2 x 5	31x4n	31x4n	B	Indep'd't(Iowa).....B	1	1665	3 1/2 x 5	34x3 1/2	34x4	I
Beck.....A Jr.	1 1/2	1285a	3 1/2 x 5	34x4 1/2	34x4 1/2	I	Double Drive.....B	3	4000	4 1/2 x 5 1/2	6	6	W	Indep'd't(Ia.).....HI	2 1/2	2940	4 1/2 x 5 1/2	30x4	30x7	I
Beck.....B-30	1 1/2	1725	3 1/2 x 5	31x5	30x6	I	Duplex.....A	2	2775	4 x 5 1/2	35x5n	38x7n	W	Indep'd't(Ohio).....F	1 1/2	2385	4 1/2 x 5 1/2	30x3 1/2	30x5	W
Beck.....C-4	2	1810	3 1/2 x 5	30x6	30x6	I	Duplex.....E	3 1/2	3500	4 1/2 x 5 1/2	30x8	30x8	I	Indep'd't(Ohio).....H	2 1/2	3085	4 1/2 x 5 1/2	30x4	30x4d	W
Beck.....D-50	2																			



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Kleiber.....BB	2	\$3600	4 1/2 x 5 1/2	36x4k 36x7k	W	Old Reliable.....A	1 1/2	\$2350	4 x 5	34x4 36x6	W	Service.....102	0	.....	4 1/2 x 6	36x6 40x6d	W
Kleiber.....B	2 1/2	3950	4 1/2 x 5 1/2	36x5k 36x8	W	Old Reliable.....B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	Signal.....NF	1	\$1950	3 1/2 x 5	34x5n 36x6n	W
Kleiber.....C	3 1/2	4600	4 1/2 x 5 1/2	36x5 36x5d	W	Old Reliable.....C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Signal.....H	1 1/2	2450	4 1/2 x 5 1/2	34x4 36x6	W
Kleiber.....D	5	5300	5 x 6	36x6 40x12	W	Old Reliable.....D	5	5250	4 1/2 x 6	36x6 40x6d	W	Signal.....J	2 1/2	2875	4 1/2 x 5 1/2	34x4 36x8	W
Koehler.....D	1 1/2	2150	3 1/2 x 5	34x3 1/2 34x5	W	Old Reliable KLM	7	6000	4 1/2 x 6	36x6 40x7d	W	Signal.....M	3 1/2	3675	4 1/2 x 5 1/2	36x5 40x5d	W
Koehler.....M	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	*Oldsmobile Econ	1	1095	3 1/2 x 5 1/2	35x5n 35x5n	W	Signal.....R	5	4400	4 1/2 x 6	36x6 40x6d	W
Koehler.....MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Olympic.....A	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x8	W	Southern.....10	1	2090	3 1/2 x 5	34x3 1/2 34x4	W
Koehler.....F	3 1/2	4470	4 1/2 x 5 1/2	36x5 36x10	W	Oneida.....B9	1 1/2	2825	4 x 5 1/2	36x3 1/2 36x7	W	Southern.....15	1 1/2	2500	3 1/2 x 5 1/2	36x6n 34x4	W
Koehler, Mt. Trac.	3 1/2	3275	4 x 5 1/2	36x4 36x7	W	Oneida.....C9	2 1/2	3200	4 x 5 1/2	36x4 36x8	W	Southern.....20	2	2990	3 1/2 x 5 1/2	36x6n 40x8k	W
Krebs.....23	3 1/2	1260	3 1/2 x 5	34x4 1/2 34x4 1/2	B	Oneida.....D9	3 1/2	4050	4 1/2 x 5 1/2	36x5 36x10	W	*Standard.....75	1 1/2	1330	3 1/2 x 5	33x5n 33x5n	W
Krebs.....24	1	1565	3 1/2 x 5	34x5 34x5	W	Oneida.....E9	5	4725	4 1/2 x 5 1/2	36x6 40x12	W	Standard.....1-K	1 1/2	1600	3 1/2 x 5	34x3 1/2 34x5k	W
Krebs.....45	1 1/2	2125	4 1/2 x 5 1/2	36x4 36x7	W	Oshkosh.....A	2	3250	3 1/2 x 5	36x6n 36x6n	B	Standard.....76	2 1/2	2400	4 1/2 x 5 1/2	36x4k 36x7k	W
Krebs.....75	2 1/2	2375	4 1/2 x 5 1/2	36x4 36x8	W	Oshkosh.....AA	2	3400	3 1/2 x 5	36x6n 36x6n	B	Standard.....66	3 1/2	3150	4 1/2 x 5 1/2	36x5 36x10	W
Krebs.....110	3 1/2	2975	4 1/2 x 5 1/2	36x5 40x10	W	Oshkosh.....B	2 1/2	3850	4 x 5 1/2	38x7n 38x7n	B	Standard.....5-K	5	4400	4 1/2 x 6	36x6 40x12	W
						Oshkosh.....BB	2 1/2	4000	4 x 5 1/2	38x7n 38x7n	B	*Star.....14	1 1/2	6100	3 1/2 x 5 1/2	36x3 1/2 36x3 1/2	B
Larrabee.....X-2	1 1/2	1925	3 1/2 x 5 1/2	34x5n 34x5n	B	*Overland.....4	1 1/2	450	3 1/2 x 4	30x3 1/2 30x3 1/2	B	Sterling.....1	1 1/2	2385	4 x 5 1/2	36x3 1/2 36x5k	W
Larrabee.....U	1 1/2	2400	3 1/2 x 5	34x5 34x5	W	Packard.....EC	2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	Sterling.....2	2 1/2	3085	4 x 5 1/2	36x4k 36x6k	W
Larrabee.....K	2 1/2	3100	3 1/2 x 5	34x5 36x7	W	Packard.....ED	3-4	4100	4 1/2 x 5 1/2	36x6 40x8n	W	Sterling.....3	3 1/2	3290	4 1/2 x 5 1/2	36x4k 36x4k	W
Larrabee.....K-5	2 1/2	3450	4 1/2 x 5 1/2	36x4 36x8	W	Packard.....EF	5-7 1/2	4500	5 x 5 1/2	36x5 36x5d	W	Sterling.....5-W	5	4950	5 x 6 1/2	36x6 40x6d	W
Larrabee.....L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Paige.....52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	Sterling.....5-C	5	5500	5 x 6 1/2	36x6 40x6d	C
Larrabee.....W	5-7	4800	4 1/2 x 6	36x6 40x6d	W	Paige.....52-20	2 1/2	2420	4 x 5 1/2	34x4 34x8	W	Sterling.....7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x7d	C
						Paige.....51-13	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	*Stewart.....14	1 1/2	1245	3 1/2 x 5 1/2	34x4 1/2 34x4 1/2	I
Maccar.....L	1 1/2	.....	4 1/2 x 5 1/2	36x4 36x6	W	Parker.....C-22	1	1875	4 1/2 x 5 1/2	34x5n 34x5n	W	Stewart.....15	1 1/2	1445	3 1/2 x 5 1/2	35x5n 35x5n	I
Maccar.....H-A	2	.....	4 1/2 x 5 1/2	36x4 36x4d	W	Parker.....G-22	2 1/2	3200	4 1/2 x 6	34x4 36x4d	W	Stewart.....9	1 1/2	1700	3 1/2 x 5	34x5 34x5	I
Maccar.....H-2	3	.....	4 1/2 x 5 1/2	36x4 36x5d	W	Parker.....J-20	3 1/2	3950	4 1/2 x 6	36x5 40x5d	W	Stewart.....7	2 1/2	2190	4 1/2 x 5 1/2	34x4 34x7	I
Maccar.....M-3	4	.....	4 1/2 x 5 1/2	36x5 36x6d	W	Parker.....M-20	5	4850	5 x 6	36x6 40x6d	W	Stewart.....7-X	2 1/2	2390	4 1/2 x 5 1/2	34x4 34x7	I
MacDonald.....A	5-6	.....	4 1/2 x 6	36x5 40x6d	W	Parker.....Revere	1	1380	3 1/2 x 5	35x5n 35x5n	W	Stewart.....10-X	3 1/2	3190	4 1/2 x 5 1/2	36x5 36x5d	I
Mack.....AB D.R.	1 1/2	3150	4 x 5	36x4 36x3 1/2	D	Patriot.....Lincoln	2	2050	4 x 5 1/2	34x3 1/2 34x5	W	*Stewart.....14	1 1/2	1245	4-3 1/2 x 5 1/2	34x4 1/2 34x4 1/2	W
Mack.....AB Chain	1 1/2	3000	4 x 5	36x4 36x3 1/2	C	Patriot.....Washg'tn	3	2900	4 1/2 x 5 1/2	34x4 34x7	W	*Stoughton.....C	3 1/2	1240	3 1/2 x 5	34x4 1/2 34x4 1/2	W
Mack.....AB Chain	2	3300	4 x 5	36x4 36x4d	C	Pierce-Arrow.....	2	3200	4 x 5 1/2	36x4 36x4d	W	Stoughton.....A	1	1700	3 1/2 x 5 1/2	34x5 34x5	W
Mack.....AB D.R.	2 1/2	3750	4 x 5	36x4 36x4d	C	Pierce-Arrow.....	3 1/2	4350	4 1/2 x 6	36x5 36x5d	W	Stoughton.....B	1 1/2	2150	3 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack.....AB D.R.	2 1/2	3850	4 x 5	36x4 36x4d	D	Pierce-Arrow.....	5	4850	4 1/2 x 6	36x5 40x6d	W	Stoughton.....D	2	2490	4 x 5 1/2	36x4 36x7	W
Mack.....AB Chain	2 1/2	3400	4 x 5	36x4 36x4d	C	Pittsburgher.....	1 1/2-2	3000	3 1/2 x 5	36x4 36x6	W	Stoughton.....F	3	3150	4 1/2 x 5 1/2	36x5d 36x5d	W
Mack.....AC Chain	3 1/2	4950	5 x 6	36x6 40x5d	C	Pittsburgher.....	3	3800	4 1/2 x 5 1/2	36x5k 36x8	W	Sullivan.....E	2	2800	4 1/2 x 5 1/2	36x4k 36x7k	W
Mack.....AC Chain	5	5500	5 x 6	36x6 40x6d	C	Power.....F	2	3150	3 1/2 x 5 1/2	36x5 36x7	W	Sullivan.....H	3 1/2	3750	4 1/2 x 6	36x5 36x5d	W
Mack.....AC Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Power.....C	3 1/2	4250	4 1/2 x 5 1/2	36x5 40x10	W						
Mack.....AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Preromac.....D-143	1 1/2	2475	3 1/2 x 5	36x6n 36x6n	W						
Mack Trac.....AB	5	4900	4 x 5	36x4 36x4d	C							*Thomart.....	1 1/2	1795a	4 x 5 1/2	34x5 34x5	C
Mack Trac.....AC	7	4350	4 x 5	36x5 40x5d	C	*Rainier.....R-21	3 1/2	.....	3 1/2 x 5	35x5n 35x5n	W	Tiffin.....GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack Trac.....AC	10	5500	5 x 6	36x6 40x6d	C	Rainier.....R-29	1	.....	3 1/2 x 5	34x3 1/2 34x4	W	Tiffin.....MW	2 1/2	2700	4 1/2 x 5 1/2	36x4 36x3 1/2	W
Mack Trac.....AC	13	5750	5 x 6	36x6 40x12	C	Rainier.....R-26	1 1/2	.....	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin.....PW	3 1/2	3600	4 1/2 x 5 1/2	36x5 40x6d	W
Mack Trac.....AC	15	6000	5 x 6	36x7 40x7d	C	Rainier.....R-28	2	.....	4 1/2 x 5 1/2	34x4 34x6	W	Tiffin.....PW	5	4300	4 1/2 x 6	36x6 40x6d	W
*Mapleleaf.....	3	3000	3 1/2 x 5 1/2	34x5n 36x6n	W	Rainier.....R-20 1/2-3	2 1/2	.....	4 1/2 x 5 1/2	34x4 34x7	W	Tiffin.....UW	6	4500	4 1/2 x 6	36x6 40x12	W
*Mapleleaf.....AA	3	3630	4 x 5 1/2	36x4 36x7	W	Rainier.....R-15 3/4-6	.....	.....	4 1/2 x 5 1/2	36x5 36x5d	W	Titan.....	2	2750	4 x 5	36x4k 36x7k	D
*Mapleleaf.....BB	3	4050	4 1/2 x 5 1/2	36x4 36x4d	W	Rainier.....R-17	5-6	.....	4 1/2 x 6	36x6 40x6d	W	Titan.....	2 1/2	2950	4 1/2 x 5 1/2	36x4k 36x5k	D
*Mapleleaf.....CC	4	4800	4 1/2 x 5 1/2	36x5 36x5d	W	Ranger.....TK-20-2	1 1/2	2450	3 1/2 x 5	36x6n 38x7n	W	Titan.....	3 1/2	3950	4 1/2 x 6	36x5k 40x10k	D
*Mapleleaf.....DD	5	5635	4 1/2 x 5 1/2	36x6 40x6d	W	*Reo.....F	3 1/2-1 1/2	1245	4 1/2 x 5 1/2	34x4 1/2 34x4 1/2	B	Titan.....	5	4550	4 1/2 x 6	36x5 40x12	D
Master.....JW	1 1/2	2200	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Reliance.....10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Tower.....J	1 1/2	2000a	4 1/2 x 5 1/2	35x5n 38x7n	W
Master.....JD	1 1/2	2500	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Reliance.....20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Tower.....H	2 1/2	2475a	4 1/2 x 5 1/2	36x4 36x7	W
Master.....Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Republic.....20B	2 1/2	1395b	3 1/2 x 5	32x4 1/2 32x4 1/2	I	Tower.....G	3 1/2	3475a	4 1/2 x 5 1/2	36x5 36x5d	W
Master.....W	2 1/2	2800	4 1/2 x 5 1/2	34x4 36x7	W	Republic.....10	1	1395	3 1/2 x 5	34x4 34x4	I	Traffic.....	1 1/2	1505	3 1/2 x 5	35x5n 35x5n	I
Master.....DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Republic.....10 Exp	1	1695	3 1/2 x 5	34x5n 34x5n	I	Traffic.....C	2	1505	3 1/2 x 5	34x3 1/2 34x5k	I
Master.....A	3 1/2	3900	4 1/2 x 6	36x5 40x5d	W	Republic.....11X	1 1/2	1795	3 1/2 x 5	34x4 34x6	I	Traffic.....	3	1895a	4 1/2 x 6	36x4 36x7	I
Master.....E	3 1/2	4290	4 1/2 x 6	36x5 40x5d	D	Republic.....19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	*Transport.....15	1	1295	3 1/2 x 5	32x4 1/2 32x4 1/2	B
Master.....Y	4	4490	4 1/2 x 6	36x5 40x6d	D	Republic.....20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Transport.....25	1 1/2	1405	3 1/2 x 5 1/2	34x3 1/2 34x4k	I
Master.....B	4	4990	4 1/2 x 6	36x6 40x6d	W	Rowe.....CW	1 1/2	3000	3 1/2 x 5	36x6n 36x6n	W	Transport.....35	2	1855	3 1/2 x 5	36x3 1/2 36x6k	I
Master.....F	5	5090	4 1/2 x 6	36x6 40x6d	D	Rowe.....C.D.W.	2	3300	4 x 6	34x4 36x3 1/2	W	Transport.....55	3	2385	4 1/2 x 5 1/2	36x4k 36x8k	I
Master Trac.....DDT	0	3390	4 1/2 x 6	34x4 36x7	D	Rowe.....G.S.W.	3	4150	4 x 6	34x5 36x3 1/2	W	Transport.....60	3 1/2	2585	4 1/2 x 5 1/2	36x4k 36x8k	I
*Maxwell.....1 1/2	1 1/2	912	3 1/2 x 5 1/2	32x3n 32x4n	W	Rowe.....G.P.W.	3	5250	3 1/2 x 5 1/2	38x7n 42x9n	W	Transport.....75	3 1/2	3485	4 1/2 x 6	36x5k 36x12k	I
Menominee.....1	1	1650	4 x 5	34x5n 34x5n	W	Rowe.....HW	4	4500	4 1/2 x 6	36x6 36x6d	W	Traylor.....E	1 1/2	2390	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Menominee.....HT	1 1/2	2000	3 1/2 x 5	34x3 1/2 36x5	W	Rowe.....F.W.	5	5500	4 1/2 x 6	36x6 40x6d	W	Traylor.....C	2 1/2	2850	4 x 5 1/2	36x4 36x7	W
Menominee.....H	1 1/2	2175	4 x 5	36x3 1/2 36x5	W	Ruggles.....20	1	1195	3 1/2 x 5	34x5n 34x5n	B	Traylor.....D	3 1/2	2300	4 1/2 x 5 1/2	36x4 36x8k	W
Menominee.....D	2 1/2	2875	4 x 6	36x4 36x8	W	Ruggles.....40	2	1795	4 x 5	34x5n 34x7	D	Traylor.....F	5-6	4700	4 1/2 x 6	36x6 40x6d	W

# Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Walker-Johnson A	2	\$2250	3 1/2 x 5	34x3 1/2 34x6	W	Wichita.....K	2	\$1875	3 1/2 x 5 1/4	36x3 1/2 36x4k	W	Wilcox.....F	5	\$4350	4 1/2 x 6 1/2	36x5 40x6d	W
Walker-Johnson B	3	2750	4 1/2 x 5 1/2	36x4 36x8	W	Wichita.....M	1	2400	3 1/2 x 5 1/4	36x3 1/2 36x6k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5	36x3 1/2 36x5	W
Walter.....M	2 1/2	3850	4 1/2 x 5 1/2	36x4 36x8	D	Wichita.....RX	3	3200	4 1/2 x 5 1/2	36x4k 36x8k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	36x4 36x7	W
Walter.....S	5	4850	4 1/2 x 5 1/2	36x6 40x6d	W	Wichita.....O	4	3500	4 1/2 x 5 1/2	36x5k 36x5k	W	Wilson.....G	3 1/2	3685	4 1/2 x 5 1/2	36x5 36x5	W
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5n 35x5n	W	Wilcox.....AA	1	1900	3 1/2 x 5 1/2	36x4k 36x4k	W	Wilson.....H	5	4520	4 1/2 x 6	36x6 40x6	W
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	36x5 36x10	W	Wilcox.....BB	1 1/2	2550	4 1/2 x 5	36x4 36x5	W	*Wisconsin.....A	1	1750	3 1/2 x 5	34x5n 34x5n	W
Western.....W1	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2 36x5k	W	Wilcox.....D	2 1/2	3000	4 1/2 x 5	36x4k 36x3 1/2 k	W	Wisconsin.....B	1 1/2	2100	3 1/2 x 5	35x5 36x6	W
Western.....L1	1 1/2	2550	3 1/2 x 5	36x3 1/2 36x5k	W	Wilcox.....E	3 1/2	3350	4 1/2 x 6	36x5k 36x5k	W	Wisconsin.....C	2 1/2	270j	4 1/2 x 5 1/2	36x6n 36x7	W
Western.....L2	1 1/2	3350	4 1/2 x 5 1/2	36x4 36x7	W							Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	36x6n 40x8	W
Western.....L3	1 1/2	3350	4 1/2 x 5 1/2	36x4 36x7	W							Wisconsin.....E	5	3500	4 1/2 x 6 1/2	36x6 36x10	W
Western.....W3	1 1/2	4250	4 1/2 x 5 1/2	36x5 40x5d	W							Wisconsin.....F	7	4000	5 1/2 x 6 1/2	36x6 36x12	W
*White.....15	20	2400	3 1/2 x 5 1/2	34x5n 34x5n	B							Witt-Will.....N	1 1/2	2450	3 1/2 x 5	36x3 1/2 36x5k	W
White.....20	30	3250	3 1/2 x 5 1/2	36x4k 36x7k	D							Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	36x3 1/2 36x7k	W
White.....40	3 1/2	4200	3 1/2 x 5 1/2	36x5 40x5d	I							Wolverine.....J	1	2125	3 1/2 x 5	34x3 34x4	W
White.....45	5	4500	4 1/2 x 5 1/2	36x5 40x6d	I							Wolverine.....J	1 1/2	2375	3 1/2 x 5	34x3 34x5	W
White Hick.....E	1	1225	3 1/2 x 5	34x5n 34x5n	D							Wolverine.....J	2	2640	3 1/2 x 5	34x4 34x7	W
White Hick.....H	1 1/2	1375	3 1/2 x 5	36x3 1/2 36x5	W							Wolverine.....L	2 1/2	3425	4 1/2 x 5 1/2	36x5 36x10	W
White Hick.....K	2 1/2	1075	4 1/2 x 5 1/2	36x4 36x5	W							Wolverine.....L	3 1/2	4100	4 1/2 x 5 1/2	36x5 36x10	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.  
 r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl.  
 d—dual tires, k—pneumatic tires optional at extra cost. n—pneumatic tires, a—price includes several items of equipment. b—price includes body. — express truck or delivery wagon. — Canadian Make. trac—tractor.

# Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity
Allis-Chal. G.P.	6-12	\$250	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Fordson.....	18-30	\$ 395	4	Own	4-4x5	G,K	2	Oldsmar GarK	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1
Allis-Chalm.....L	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Franklin.....G	18-30	4000	*2	Clim.	4-5 x 6 1/2	G or K	3-4	Peoria.....L	12-25	1600	4	Clim.	4-5 x 6 1/2	G,K	3
Allis-Chalm.....M	20-35	1885	4	Own	4-4 1/2 x 6 1/2	G or K	3-4	Franklin.....C	18-30	3350	*2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....C	18-36	1750	4	Own	4-5 1/2 x 6	G,K,D	4
Allis-Chalm.....Z-G	20-36	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Franklin.....G2	18-30	4350	*2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....A	40-75	3550	4	Own	4-7 x 8	Gas.	10
Allwork.....C	14-28	1395	4	Own	4-4 1/2 x 6	G or K	3	Frisk.....A	12-20	.....	4	Bev.	4-4 x 6	G,K	2-3	Pleoman.....C	18-30	1295	4	Buda	4-4 1/2 x 6	G,K	3-4
ARO.....1921-22	3-6	385	4	Own	4-5 x 6	G or K	3	Frisk.....C	15-28	.....	4	Beav.	4-4 1/2 x 6	G,K	2-3	Reliable.....	10-20	390	4	Own	2-6 x 7	Ker.	2
Aultman-T.....	15-30	1900	4	Clim.	4-5 x 6 1/2	G,K	4									Reliable.....	10-20	390	4	Own	2-6 x 7	Ker.	2
Aultman-T.....	22-45	2810	4	Clim.	4-5 1/2 x 8	G,K	6	Grain Belt.....A	18-30	2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Rez.....	12-25	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3
Aultman-T.....	30-60	4090	4	Clim.	4-7 x 10	G,K,D	8-10	Gray.....	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Russell.....	12-24	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3
Automot. B-3	12-24	1250	4	Here.	4-4 x 5 1/2	Gas.	2-3	Gray.....	22-44	2165	3	Wauk.	4-5 x 6 1/2	Gas.	4-5	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4
Avery, S.R. Cul.	5-10	.....	4	Own	4-3 x 4	G,K	2	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5
Avery.....Cult-C	5-10	.....	3	Own	6-3 x 4	G,K	2									Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10
Avery.....B	5-10	.....	4	Own	4-3 x 4	G,K	2	Hart-Parr.....20	20	765	4	Own	2-5 1/2 x 6 1/2	K,D	2	Samson.....M	.....	445	4	Own	4-4 x 5 1/2	G,K	2
Avery.....C	5-10	.....	4	Own	6-3 x 4	G,K	2	Hart-Parr.....30	30	895	4	Own	2-6 1/2 x 7	K,D	3	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2
Avery.....	8-10	.....	4	Own	2-5 1/2 x 6	G,K,D	2-3	Heider.....D	9-10	870	4	Wauk.	4-4 1/2 x 6 1/2	G,K	2	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4
Avery.....	12-20	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	Heider.....D	9-10	870	4	Wauk.	4-4 1/2 x 6 1/2	G,K	2	Shelby.....D	15-30	.....	4	Beav.	4-4 x 6	G,K	3
Avery.....	12-25	.....	4	Own	2-6 1/2 x 7	G,K,D	3-4	Heider.....C	12-20	995	4	Wauk.	4-4 1/2 x 6 1/2	G,K	3	Shelby.....C	9-18	.....	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2
Avery.....	14-28	.....	4	Own	4-4 1/2 x 6	G,K,D	4-5	Huber Light 4	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Steady Pull.....	12-21	1485	4	Own	4-4 x 5	Gas.	3
Avery.....	18-36	.....	4	Own	4-5 1/2 x 6	G,K,D	4-5	Huber Super 4	12-25	985	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3								
Avery.....	25-50	.....	4	Own	4-6 1/2 x 7	G,K,D	5-6		15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3	Tiga.....3	18-32	.....	4	Wisc.	4-4 1/2 x 6	Gas.	3-4
Avery.....	45-65	.....	4	Own	4-7 1/2 x 8	G,K,D	8-10									Toro Cultivator	6	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
								Illinois.....C	15-30	.....	4	Clim.	4-5 x 6 1/2	G,K	4	Toro Tractor 22	6-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
								Indiana.....F	5-10	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Townsend.....	10-20	800	2	Own	4-6 1/2 x 7	Ker.	2-3
								International	8-16	1670	4	Own	4-4 1/2 x 5	G,K,D	2	Townsend.....	10-20	800	2	Own	4-6 1/2 x 7	Ker.	2-3
								Internat. Titan	10-20	1780	4	Own	2-6 1/2 x 8	G,K,D	2	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4
								International.....	15-30	1750	4	Own	4-5 1/2 x 8	G,K,D	4	Townsend.....	25-50	2500	2	Own	4-8 1/2 x 10	Ker.	4-8
								J-T.....N	25-40	3000	*2	Clim.	4-5 x 6 1/2	G,K,D	3-4	Traction Motor	40-50	.....	4	.....	8-3 1/2 x 5	Gas.	4-5
								%Kinkade.....	1 1/2	190	1	Own	1-3 x 3	Gas.	.....	Traylor.....TB	6-12	500	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2
								La Crosse.....	12-24	985	2	Own	2-6 x 7	G,K	3	Trundar.....10	25-40	3750	*2	Wauk.	4-5 x 6 1/2	G or K	4
								Lauson.....5	12-25	1235	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Twin City.....	12-20	1200	4	Own	4-4 1/2 x 6	G,K	3
								Lauson.....21	15-30	1675	4	Beav.	4-4 1/2 x 6	G or K	3-4	Twin City.....	20-35	2750	4	Own	4-5 1/2 x 6 1/2	G,K	5-6
								Lauson Road	15-30	2000	4	Beav.	4-4 1/2 x 6	K	3	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 9	G,K	8-10
								Leader.....B	12-18	685	4	Own	2-6 x 6 1/2	G,K,D	2-3	Uncle Sam C20	12-20	1795	4	Weid.	4-4 x 5 1/2	G	2-3
								Leader.....N	10-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Uncle Sam B19	20-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4
								Leader.....GU	18-35	2150	*2	Clim.	4-5 x 6 1/2	Gas.	4	Uncle Sam D21	20-30	1895	4	Beav.	4-4 1/2 x 6	G or K	3-4
								Linn.....H4J	40	4500	*	Cont.	4-4 1/2 x 5 1/2	Gas.	4	Utilitor.....501	21 1/2-4	295	4	Own	1-3 1/2 x 4 1/2	G	1
								Linn.....W	60	5000	*	Wauk.	4-5 x 6 1/2	Gas.	4	Utilitor.....501A	21 1/2-4	340	4	Own	1-3 1/2 x 4 1/2	G	1
								Little Giant, B	16-22	2200	4	Own	4-4 1/2 x 5	K	4	Wallis.....K	15-25	.....	4	Own	4-4 1/2 x 5 1/2	G,K	3
								Little Giant, A	26-35	3300	4	Own	4-5 1/2 x 6	K	6	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	Ker.	3
								Lombard. 1922	8-15	8950	*2	Wisc.	6-5 1/2 x 6 1/2	Gas.	16	Wetmore 21-22	12-25	1185	4	Wauk.	4-4 x 5 1/2	G,K	3
								Lombard. 1922	50	5300	*2	Wisc.	4-4 1/2 x 6 1/2	Gas.	6-10	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	Gas.	2
								Merry Gar 1922	2	210	2	Evin	1-2 1/2 x 2 1/2	Gas.	.....	Wichita.....T	15-30	2000	4	Beav.	4-4 1/2 x 6	G,K,D	3-4
								Minne.....All-P	12-25	800	4	Own	4-4 1/2 x 7	G or K	3	Wisconsin.....E	16-30	1850	4	Clim.	4-5 x 6 1/2	G or K	3
								Minne. Gen.P	17-30	1600	4	Own	4-4 1/2 x 7	G or K	3-4	Wisconsin.....F	20-40	2050	4	Wauk.	4-5 x 6 1/2	G or K	4
								Minne. Med.D	22-44	2650	4	Own	4-6 x 7	G or K	5-6	Wisconsin.....H	22-40	2550	4	Clim.	4-5 1/2 x 7	G or K	4-6
								MinneHeavyD	35-70	3850	4	Own	4-7 1/2 x 9	G or K	8-9	Yuba.....12-20	12-20	2400	*2	Wisc.	4-4 1/2 x 6 1/2	G,K,D	3
								Mohawk. 1922	8-16	650	2	Light	4-3 1/2 x 4 1/2	K or G	1-2	Yuba.....15-25	15-25	2750	*2	Wisc.	4-4 1/2 x 6	G,K,D	..
								Moline Univ.	9-18	650	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....20-35	20-35	3900	*2	Wisc.	4-5 1/2 x 7	G,K,D	4
								Moline Orch.	9-18	.....	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....25-40	25-40	4250	*2	Wisc.	4-6 1/2 x 7	G,K,D	..
								Moline Ouh.	9-18	.....	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....	35-40	4750	*2	Yuba	4-5 1/2 x 7	D	..
								Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	.....	Zelle.....	12-25	.....	4	Buda	4-4 1/2 x 5 1/2	G or K	3
								NB.....1	3-6	425	4	Own	2-3 1/2 x 4	Gas.	1								
								Nichols-Shep.	20-42	2650	4	Own	8 x 10	G or K	3-6								
								Nichols Shep.	25-50	3000	4	Own	9 x 12	G or K	4-7								
								Nilson Senior..	20-40	1975	5	Wauk.	4-5 x 6 1/2	G,K	4								
								Oil Pull.....K	12-20	.....	4	Own	2-6 x 8	K,D	3								
								Oil Pull.....H	16-30	.....	4	Own	2-7 x 8 1/2	K,D	4								
								Oil Pull.....G	20-40	.....	4	Own	2-8 x 10	K,D	5-6								
								Oil Pull.....E	30-60	.....	4	Own	2-10x12	K,D	8-10								
ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Flow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. *—Beaver. Clim.—Climate. Cont.—Continental. Dom.—Domestic. Evin.—Evinard. Here.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nwavy.—New Way. Nor.—Northway. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. ‡Track Runner. †Industrial Tractor. ‡Garden Tractor.																							





## Replates Silver and Nickel Parts

Every car owner will thank you for showing him KWIK-AK-SHUN Silver - Nickel Plating Paste, for it is a radical innovation in silver re-finish.

This plating paste is different in its action from any polish on the market, it does not act as a polish but plates. It brings back the "new appearance" to all parts of the car that have a silver or nickel finish.

This paste contains no abrasive or grit of any kind and positively does not wear away the finish but builds it up with real silver.

As KWIK-AK-SHUN comes in concentrated paste form it is put up in handy collapsible tubes so that there is no waste and will keep indefinitely in its original form. Will silver plate any metal that can be silver-plated. Sold through jobbers.

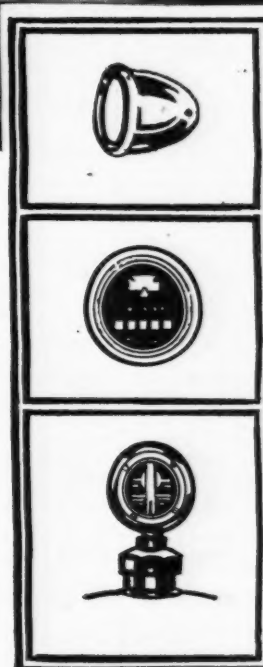
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TRADE MARK REG. U.S. PAT. OFF.  
(QUICK ACTION)

**SILVER-NICKEL PLATING PASTE**  
Pure Coin-Silver from U.S.Mint

## Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	
Aco.....	F-G-B	4-3 1/2 x 5	114	32x4	\$1295	\$1295	.....	.....	\$2295	Lincoln.....	Own.	8-3 1/2 x 5	130	33x5	.....	.....	.....	\$3900	.....	
Aco.....	L-H-S	6-3 1/2 x 5	117	32x4	2260	2260	.....	.....	3680	Lincoln.....	Own.	8-3 1/2 x 5	136	33x5	\$3800	\$3800	\$3800	.....	\$4900	
Aco.....	C Cont.	6-3 1/2 x 5 1/2	123	33x4 1/2	2975	2975	.....	.....	4500	Locomobile.....	Own.	6-4 1/2 x 5 1/2	142	35x5	.....	b7600	7600	10500	11000	
Ambassador.....	R Cont.	6-3 1/2 x 5 1/2	136	33x5	b1500	\$4500	.....	.....	6500	Maibehm.....	B Own.	6-3 1/2 x 4 1/2	116	32x4	1395	1395	b1495	2165	2165	
American.....	C Cont.	6-3 1/2 x 5	127	33x4 1/2	b1985	1850	1925	.....	2995	Marmen.....	34 Own.	6-3 1/2 x 5 1/2	136	32x4 1/2	3385	b3185	3185	3685	4385	
Anderson.....	Series 40	Cont.	6-3 1/2 x 5 1/2	120	33x4	2195	1650	1705	\$2150	Marwell.....	Own.	4-3 1/2 x 5 1/2	109	31x4	885	885	.....	1365	1485	
Apperson.....	6-21-S	Own.	8-3 1/2 x 5	130	34x4 1/2	.....	2620	2645	3625	McFarlan.....	1922	Own.	6-4 1/2 x 5	140	33x5	6300	b6300	6300	7500	7500
Auburn.....	6-51	Own.	6-3 1/2 x 4 1/2	121	32x4	1575	1575	1615	2275	Mercer.....	Series 5	Own.	4-3 1/2 x 6 1/2	132	32x4 1/2	3950	b3950	6350	4850	5250
Auburn.....	6-51	Own.	6-3 1/2 x 4 1/2	121	32x4 1/2	.....	n2195	.....	.....	Merit.....	Cont.	Own.	6-3 1/2 x 4 1/2	119	32x4	1895	1895	.....	.....	.....
Bay State.....	Cont.	6-3 1/2 x 4 1/2	121	32x4	1800	1800	.....	2400	2500	Mitchell.....	F-50	Own.	6-3 1/2 x 5	120	33x4	a1490	1490	b1690	2050	2275
Bel.....	4-32	I-S.	4-3 1/2 x 5	114	31x4	1095	1095	.....	.....	Monroe.....	1922-S-9	Own.	4-3 1/2 x 4 1/2	117	32x4 1/2	950	950	.....	.....	.....
Bel.....	6-50	I-S.	6-3 1/2 x 5	124	32x4	1545	1545	.....	.....	Moore.....	6-40	Own.	6-3 1/2 x 4 1/2	115	31x4	1295	1295	.....	1695	.....
Biddle.....	B1 & B5	Buda.	4-3 1/2 x 5 1/2	121	32x4	2950	b2950	.....	3950	Moore.....	6-58	Own.	6-3 1/2 x 4 1/2	115	31x4	1785	1785	2285	2785	2785
Brewster.....	91	Own.	4-4 x 5	125	32x4 1/2	5000	5000	.....	7000	Nash.....	691-96-97	Own.	6-3 1/2 x 5	121	33x4	1360	1390	b1545	.....	.....
Buick.....	1922-34-35-36-37	Own.	4-3 1/2 x 5 1/2	109	31x4	895	935	.....	1295	Nash.....	692-94-95	Own.	6-3 1/2 x 5	127	34x4 1/2	.....	1540	2000	2390	.....
Buick.....	1922-41-5-6-7	Own.	6-3 1/2 x 4 1/2	118	33x4 1/2	1365	1395	.....	1885	Nash Four.....	41-4	Own.	4-3 1/2 x 5	112	33x4	965	985	.....	1485	1645
Buick.....	1922-18-9-50	Own.	6-3 1/2 x 4 1/2	124	34x4 1/2	n1785v	n1785v	1585	2075	National.....	BB	Own.	6-3 1/2 x 5 1/2	130	32x4 1/2	a2475	b2475	2375	3725	b3250
Cadillac.....	61	Own.	8-3 1/2 x 5 1/2	132	33x5	3100	3150	3150	b3875	Noma.....	3C	Cont.	6-3 1/2 x 4 1/2	128	32x4 1/2	2000	b2100	e2200	.....	3200
Case.....	X Cont.	Own.	6-3 1/2 x 5 1/2	122	32x4 1/2	1750	1790	.....	2550	Noma.....	ID	Bea.	6-3 1/2 x 5 1/2	128	32x4 1/2	3000	b3100	e3200	.....	5500
Case.....	W Cont.	Own.	6-3 1/2 x 5 1/2	129	34x4 1/2	.....	2200	2250	2850	Norwalk.....	430-K5	Lye.	4-3 1/2 x 5	110	32x3 1/2	.....	1035	.....	.....	.....
Chalmers.....	1922	Own.	6-3 1/2 x 4 1/2	117	32x4	1345	1395	1495	1995	Oakland.....	6-44	Own.	6-2 1/2 x 4 1/2	115	32x4	1120	1145	b1265	1685	1785
Chalmers.....	1922	Own.	6-3 1/2 x 4 1/2	122	32x4	.....	.....	1495	.....	Ogren.....	6 T De Luxe	Cont.	6-3 1/2 x 5 1/2	164	33x5	b3750	3750	3850	4500	4800
Chandler.....	Six	Own.	6-3 1/2 x 5	123	33x4	1595	1595	1995	2295	Oldsmobile.....	43-A	Own.	4-3 1/2 x 5 1/2	115	32x4	1115	1145	b1265	1645	1795
Chevrolet.....	490	Own.	4-3 1/2 x 4	102	30x3 1/2	525	525	.....	850	Oldsmobile.....	46	Own.	8-2 1/2 x 4 1/2	122	35x4 1/2	.....	b1735	1735	.....	2635
Chevrolet.....	FB	Own.	4-3 1/2 x 5 1/2	110	32x4	975	975	.....	1575	Oldsmobile.....	47	Own.	8-2 1/2 x 4 1/2	115	32x4	1595	1595	b1595	2145	2295
Cleveland.....	41	Own.	6-3 x 4 1/2	112	32x4	1175	1195	.....	1550	Overland.....	4	Own.	4-3 1/2 x 4	100	30x3 1/2	550	550	.....	850	895
Cole.....	890	Own.	8-3 1/2 x 5 1/2	127 1/2	33x5	2485	b2485	2485	3185	Packard.....	Single-Six	Own.	6-3 1/2 x 5	126	33x4 1/2	2485	2485	a2250	3175	3275
Columbia.....	Challenger	Own.	6-3 1/2 x 5	115	32x4	.....	1195	.....	1995	Packard.....	Single-Six	Own.	6-3 1/2 x 5	133	33x4 1/2	.....	u2350	2685	.....	3525
Columbia.....	Deluxe	Own.	6-3 1/2 x 4 1/2	115	32x4	1475	1475	.....	2295	Packard.....	Twin Six	Own.	12-3 x 5	136	35x5	3850	3850	3850	5240	6400
Columbia.....	Light Six	Own.	6-3 1/2 x 4 1/2	115	31x4	995	985	.....	1395	Paige.....	6-44	Own.	6-3 1/2 x 5	119	32x4	1465	1465	u1290	1995	2245
Comet.....	C-53	Own.	6-3 1/2 x 5 1/2	125	33x4 1/2	.....	1985	2085	2985	Paige.....	6-66	Cont.	6-3 1/2 x 5	131	33x4 1/2	a2495	u2245	2195	3100	3165
Crawford.....	22-6-63	Own.	6-3 1/2 x 5 1/2	122 1/2	32x4	3000	3000	.....	4500	Peterson.....	22-6-52	Cont.	6-3 1/2 x 4 1/2	120	32x4 1/2	.....	1550	1585	2595	2595
Crawford-Dagmar.....	6-60	Cont.	6-3 1/2 x 5 1/2	135	33x5	.....	a3500	.....	.....	Pierless.....	56-S-7	Own.	8-3 1/2 x 5	125	34x4 1/2	.....	b2790	2790	3500	3790
Daniels.....	D-19	Own.	8-3 1/2 x 5 1/2	132	33x5	a4350	b4350	4350	6250	Pierce-Arrow.....	6-4	Own.	6-4 x 5 1/2	138	35x5	5250	b5250	5250	6800	7000
Davis.....	71	Cont.	6-3 1/2 x 4 1/2	114	31x4	.....	1295	.....	1975	Pilot.....	6-50	H-S.	6-3 1/2 x 5	120	32x4 1/2	2050	2000	2050	2950	3000
Davis.....	61-67	Cont.	6-3 1/2 x 4 1/2	120	32x4	1595	1595	b1695	2095	Premier.....	6-D	Own.	6-3 1/2 x 5 1/2	126	33x5	3150	b3100	3250	4300	5100
Dixie Flyer.....	H-S-70	I-S.	4-3 1/2 x 5	112	32x4	1175	b1295	1545	1595	Premocor.....	6-40-A	Falls.	6-3 1/2 x 4 1/2	117	32x4	1095	1095	.....	1750	1825
Dodge Brothers.....	Own.	4-3 1/2 x 4 1/2	114	32x4	850	880	.....	1280	1410	R & V Knight.....	R	Own.	4-3 1/2 x 5	116	32x4	.....	1665	.....	2385	2475
Dorris.....	6-30	Own.	6-4 x 5	132	33x5	.....	b3970	3950	4985	R & V Knight.....	U	Own.	6-3 1/2 x 4 1/2	127	32x4 1/2	2475	b2475	2475	3015	3105
Dort.....	19-14	D-Ly.	4-3 1/2 x 5	108	31x4	885	885	.....	1315	Reo Series.....	T6 & U6	Own.	6-3 1/2 x 5	120	33x4	1505	.....	1595	2355	2435
Driggs.....	Own.	4-2 1/2 x 4 1/2	104	30x3 1/2	1275	1275	.....	1975	1775	Reo.....	C	Dues.	4-4 1/2 x 6	131	32x4 1/2	3200	3200	3200	.....	4000
Duesenberg.....	Straight 8	Own.	134	33x5	6500	6500	6750	7800	7800	Rickenbacker.....	A	Own.	6-3 1/2 x 4 1/2	117	32x4	.....	1485	.....	1885	1985
Du Pont.....	A	Own.	4-3 1/2 x 5 1/2	124	32x4 1/2	3000	3200	.....	3800	Roamer.....	6-54-E	Cont.	6-3 1/2 x 5 1/2	128	32x4 1/2	2850	b2555	2785	3580	3850
Durant.....	A-22	Cont.	4-3 1/2 x 4 1/2	109	31x4	n890	890	.....	1365	Roamer.....	4-75-E	Dues.	4-4 1/2 x 6	128	32x4 1/2	3985	b3585	3750m	.....	b4650
Durant.....	B-22	Anst.	6-3 1/2 x 4 1/2	123 1/2	32x4 1/2	1600	1650	.....	2250	Rolls-Royce.....	Own.	6-4 1/2 x 4 1/2	143 1/2	33x5	.....	10,900	.....	.....	.....	.....
Earl.....	40	Own.	4-3 1/2 x 5 1/2	112	32x4	1485	1095	950	b1395	Saxon.....	125	Own.	4-3 1/2 x 5	112	32x4	1195	1195	.....	1795	1795
Elcar.....	K-4	Lye.	4-3 1/2 x 5	118	33x4	1095	1095	n1095	1345	Sayers Six.....	DP	Cont.	6-3 1/2 x 4 1/2	118	33x4	1695	1695	.....	2795	2795
Elcar.....	7-R	Cont.	6-3 1/2 x 4 1/2	118	33x4	1395	1395	n1395	2065	Seneca.....	L-2 & O-2	Lye.	4-3 1/2 x 5	108	30x3 1/2	875	875	.....	.....	.....
Elgin.....	K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1345	1295	b1345	2195	Seneca.....	50 & 51	Lye.	4-3 1/2 x 5	112	31x4	1095	1095	.....	.....	.....
Essex.....	Own.	4-3 1/2 x 5	108 1/2	32x4	.....	1095	.....	1195k	1295k	Sperling.....	A	Supr.	4-3 1/2 x 5	114	32x4	980	980	.....	1685	1685
Ford.....	T	Own.	4-3 1/2 x 4	109	30x3 1/2	r319	a348	u285	580	Standard.....	98	Own.	8-3 1/2 x 5	127	34x4 1/2	2150	b2500	2500	2750	3200
Franklin.....	9-B	Own.	4-3 1/2 x 4	115	32x4	1900	1950	u1750	2750	Stanley.....	Own.	2-4 x 5	130	32x4 1/2	2700	2700	2700	3775	3950	
Gardner.....	T-R & G	Lye.	4-3 1/2 x 5	112	32x4	805	895	.....	1095k	Stanwood Six.....	Cont.	6-3 1/2 x 4 1/2	118	33x4	1765	1765	.....	2750	.....	
Grant.....	Own.	6-3 1/2 x 4 1/2	116	32x4	1385	1385	.....	1895	1945	Star.....	Cont.	4-3 1/2 x 4 1/2	102	30x3 1/2	r319	a348	2585	580	645	
Gray.....	Own.	4-3 1/2 x 4	100	30x3 1/2	.....	490	.....	760	.....	Stearns-Knight.....	SKL4	Own.	4-3 1/2 x 5 1/2	125	34x4 1/2	2250	2250	2450	3150	3450
H.C.S.....	Series 3	Weld.	4-3 1/2 x 5 1/2	120	32x4 1/2	2400	2400	.....	2850	Stearns-Knight.....	6	Own.	6-3 1/2 x 5	130	34x4 1/2	2700	2700	2850	3350	3700
Halladay.....	4	Own.	4-3 1/2 x 5	115	32x4	1095	1095	.....	1990	Stevens.....	90	Own.	6-3 1/2 x 4 1/2	122	33x4 1/2	1575	b1595	c1625	2450	2550
Halladay.....	6	Own.	6-3 1/2 x 5	115	32x4	1595	1595	.....	2295	Stevens-Duryea.....	E	Own.	6-4 1/2 x 5 1/2	138	35x5	7250	b6900	6800	u6600	b8900
Handley-Knight.....	Own.	4-4 1/2 x 4 1/2	115	32x4 1/2	.....	905	.....	2650	3450	Studebaker.....	Light Six	Own.	6-3 1/2 x 4 1/2	112	32x4	1045	1045	.....	1375	1750
Hanson.....	30	Cont.	6-3 1/2 x 4 1/2	114	31x4	.....	.....	.....	.....	Studebaker.....	Special Six	Own.	6-3 1/2 x 5	119	32x4	1425	1475	b1475	2150	2350
Hanson Six.....	60	Cont.	6-3 1/2 x 4 1/2	121	32x4	1595	1595	1795	b2475	Studebaker.....	Big Six	Own.	6-3 1/2 x 5	126	33x4 1/2	.....	n1985	1785	2500	2700
Hatfield.....	A-42	I-S.	4-3 1/2 x 5	115	32x4	.....	1315	1315	1950	Stutz.....										